

EUR Research Information Portal

Compartmentalization by industry and government inhibits addressing climate denial

Publication status and date:

Published: 09/01/2025

DOI (link to publisher):

[10.1371/journal.pclm.0000552](https://doi.org/10.1371/journal.pclm.0000552)

Document Version

Publisher's PDF, also known as Version of record

Document License/Available under:

CC BY

Citation for the published version (APA):

Hendlin, Y. H., & Palazzo, F. P. (2025). Compartmentalization by industry and government inhibits addressing climate denial. *PLoS Climate*, 4(1), Article e0000552. <https://doi.org/10.1371/journal.pclm.0000552>

[Link to publication on the EUR Research Information Portal](#)

Terms and Conditions of Use

Except as permitted by the applicable copyright law, you may not reproduce or make this material available to any third party without the prior written permission from the copyright holder(s). Copyright law allows the following uses of this material without prior permission:

- you may download, save and print a copy of this material for your personal use only;
- you may share the EUR portal link to this material.

In case the material is published with an open access license (e.g. a Creative Commons (CC) license), other uses may be allowed. Please check the terms and conditions of the specific license.

Take-down policy

If you believe that this material infringes your copyright and/or any other intellectual property rights, you may request its removal by contacting us at the following email address: openaccess.library@eur.nl. Please provide us with all the relevant information, including the reasons why you believe any of your rights have been infringed. In case of a legitimate complaint, we will make the material inaccessible and/or remove it from the website.

ESSAY

Compartmentalization by industry and government inhibits addressing climate denial

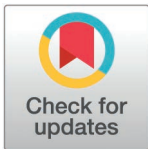
Yogi Hale Hendlin^{1,2*}, Fernando Procópio Palazzo³

1 Dynamics of Inclusive Prosperity Initiative, Erasmus University Rotterdam, Rotterdam, The Netherlands,

2 Erasmus School of Philosophy, Erasmus University Rotterdam, Rotterdam, The Netherlands,

3 Department of Law, Pontifícia Universidade Católica do Paraná (PUCPR), Curitiba, Brazil

* hendlin@esphil.eur.nl



Abstract

The move from outright denialism by the fossil fuel and related industries to ‘soft denial’ urges reassessing the mechanisms and networks of actors involved in anti-environmentalism. One high-level tactic which harnesses evolutionary psychology and organizational self-protective tendencies to willfully overlook negative outcomes involves compartmentalization. Segmented judgment applies to multiple domains, including highlighting commitments, declarations, and philanthropy as a mask for continuing unsustainability. Selective accounting gives the impression that states and companies are doing enough on climate, that things are not as bad as they seem, and that much-touted sustainable actions compensate for continuing environmental harms—in effect reducing the impetus for responsible action and diverting attention from climate change’s primary drivers. This bait-and-switch strategy fragments climate accounting by avoiding including both sustainable and unsustainable initiatives in the same ledger. This study categorizes strategies of compartmentalization according to sectoral, narrative, political, behavioral, and structural perspectives, with examples among agrochemical, fossil, and mining industries. Each of these facets is evaluated through examples of actions undertaken by corporations and public agents, often exploiting Global North-South dynamics. In spite of these aspects having different spheres of influence, acts of compartmentalization are interconnected and represent a core background frame enabling the climate denial machine.

OPEN ACCESS

Citation: Hendlin YH, Palazzo FP (2025) Compartmentalization by industry and government inhibits addressing climate denial. *PLOS Clim* 4(1): e0000552. <https://doi.org/10.1371/journal.pclm.0000552>

Editor: Marco Grasso, University of Milan-Bicocca Faculty of Sociology: Università degli Studi di Milano-Bicocca Dipartimento di Sociologia e Ricerca Sociale, ITALY

Published: January 9, 2025

Copyright: © 2025 Hendlin, Palazzo. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Funding: This work was supported by Brown University’s Climate Social Science Network (YH and FP); the Erasmus University-Erasmus MC-TU Delft Convergence Resilient Delta (Kickstarter grant to YH), and the Kyoto Research Institute on Humanity and Nature (Incubation Study grant to YH). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

1. Introduction

While climate denial has become a relatively recent revelation in popular culture, the product defense industry for seven decades has actively downplayed the risks of fossil fuels [1]. During this period, climate denial has been in perpetual metamorphosis, often dialectically, playing off environmental advocates and policies, reacting to societal cues, scrambling to control disruptive narratives, and mollifying public environmental worries.

Renowned climate scientist and target of the climate denial machine Michael Mann (originator of the hockey stick graph of rising global temperature) has claimed that fossil fuel and other polluting industries have since the 2010’s switched tactics from outright denial of climate

Competing interests: The authors have declared that no competing interests exist.

change (i.e., claiming it is a hoax, or not happening at all) to “soft denial” [2]. Hardline denial is no longer credible in the face of indelible scientific consensus regarding anthropogenic climate change, paired with the rapidly growing percentage of firsthand victims and witnesses of global warming disasters. In response, industries and governments have moved into a long game of soft denialism, comprising “delay, division, deflection and doom-mongering,” Mann and others claim [3,4]. By doing too little, too late, we end up with the same inaction on climate as with full denialism, minus the environmental public pushback [5]. Through calculating the minimum necessary overtures to those concerned that authorities—public and private—take the problem seriously, anti-environmentalism flourishes even under more politically-correct constraints (e.g., via the language of offsets, carbon neutrality, and sustainability framework commitments) [6,7]. These forms of “inactivism” constitute attempts to present solutions which ultimately are obfuscatory, failing to address core unsustainabilities [3].

Climate denialism can be depicted as a complex polyhedron with many facets; ranging from hardline denialism exhibited by far-right movements and governments, to the soft denialism embedded in the context of corporate social responsibility (CSR) with selective disclosure and greenwashing tactics. Zooming-in on greenwashing practices, one might concentrate on specific tactics in which companies in a particular sector (e.g., plastics, fossil fuels, mining) conceal environmentally destructive actions through “(1) misleading language and visuals, (2) use of selective facts, (3) stating outright falsehoods, (4) factual omissions, and (5) rhetorical distortions” [8]. Zooming-out, we can identify higher level strategies which propagate downstream effects like greenwashing, but without the direct intent and premeditation. Rather than manipulating the prevailing discourse, as greenwashing does, they instead frame the discourse: environmental harms become glossed as unmitigable unintended consequences or ‘externalities’ of the main purpose of business or statecraft; polluting activities occur and are assessed independently from one another, engendering isolated narratives, geographical, and sectoral responses—blurring the structural predictability and hence accountability of extractivism [9–11]. Compartmentalizing each occurrence of pollution as unique and incomparable to others, rather than as stochastic “normal accidents” occurring when environment and health are deprioritized for competitive extraction [12], each sphere of industry appears to have its own unique discourse, actors, and tactics, which must be studied and analyzed anew each time. In this sense, greenwashing practices, selective disclosures, or strategic omissions occur in parallel domains obfuscating even the measurement of relative costs and benefits.

Denialism-through-compartmentalization encompasses the structural background which occludes recognizing and comparing patterns of environmental damage across domains of knowledge and societal sectors. Treating similar issues as if each were isolated creates a hydra impossibly cumbersome for environmental and climate advocates to address separately. Sequestering climate denialism into bureaucratic silos, industry and government reduce the impact of coordinated ecological action [13].

Compartmentalization shifts the attention of scientists and the public from upstream to proximal causes. Viewed apart from the complex relations creating them, proximate causes insufficiently encapsulate climate risks, deflecting responsibility from those entities structuring climate-destabilizing actions.

This article presents compartmentalism as a high-level core pattern of climate denialism and anti-environmentalism, building on already recognized aspects and strategies of climate denialism, usually analyzed downstream according to the particular ways in which compartmentalism manifests. Through the lens of agnotology [14], we examine various ways in which compartmentalization blocks rational climate accounting and due diligence. Tracking how ignorance perpetuates through a system, and how ignorance is “made, maintained, and manipulated” via science, politics, and other forms of institutionalized

authority [15], scientific classification itself often becomes the mechanism propagating denial [16]. This figure-ground shift from interpreting the scientific enterprise as an unmitigated public good, value-neutrally finding facts, to understanding the role that (especially commercial but also ideological) insincere interests play in the construction of knowledge, provides a useful optic for analyzing the climate denial machine and its development [16–18]. By tracing historically the interventions in science and society which have generated dissensus around appropriate ecological action, we find generalized patterns worth noting [19–23]. The strategy of compartmentalizing facts, substances, fields of science, and other distinctions which are arbitrary but have become naturalized through coordinated public relations campaigns, highlight this dimension of both hard and soft climate denial. This article contributes to critical studies of climate denial by showing that compartmentalization is a key tool of the industry playbook, as discussed and defined by public health [16,17,24].

After a brief background discussing the concept, the article explores varieties of compartmentalization evidenced in different scenarios. First, we discuss the political work of compartmentalization governments exert in concealing exploitation of natural resources and those who depend on them in the Global South through diverting attention away from environmental damage by emphasizing the pretense of delivering progress. Second, climate denial strategies in the context of the global North and South, through Brazilian examples, reveal compartmentalization to be both a governmental and corporate strategy to placate resistance and focus only on the positives of extraction. Third, compartmentalization in (agro)chemical regulation plays a major role preventing full assessment of harms, including so-called “inactive ingredients” contributing to the overall toxicity of commercial formulations. Finally, we connect compartmentalization’s various facets contributing to the climate denial machine, and discuss opportunities for same-ledger accounting to take complexities into risk analysis for environmental and climate threats, for which independent science and public advocacy can play decisive roles.

2. Modes of compartmentalization

Typologizing the various forms of compartmentalization in climate and (anti-environmental) discourse aids understanding how separating complex effects into spotlighted and repressed elements serves to mute climate discourse:

- [1] Siloing: regulating one specific chemical (e.g., PFOA) without regulating the class it belongs to (e.g., PFAS) prolongs exposures unnecessarily (see Fig 3) [25].
- [2] Bureaucratization: e.g., Norway’s state-owned extractive enterprises destroying the Amazon rainforest while also acting as majority investor in the sustainability-saving Amazon Fund (see Section 5, below).
- [3] Displacement: frontloading emissions and backloading responsibility to deal with the consequences of those emissions (e.g., net carbon neutral by 2050... starting in 2049).
- [4] Selective Risk Analysis: in chemical formulations, only the active ingredients are tested for environmental or health harms instead of the full commercial formulation (e.g., glyphosate rather than RoundUp® with its chemical cocktail of adjuvants and surfactants).
- [5] Distraction: purposive compartmentalization creates red-herrings for the public, so that environmental and social harms are drowned out in PR soundbites (this is the one explicitly intentional form of compartmentalization).

By dividing up measurements into discrete categories which do not inform each other, or are seen as a cohort, climate-changing pollution is mitigated not in terms of actual effluent reduction, but through moral accounting.

Moral accounting creates accountability systems that allow humans to achieve the satisfaction of engaging in normatively approved actions without addressing the underlying issue thoroughly [26]. It creates selective sensitivity, caring about words like ‘sustainability’ or actions like purchasing carbon credits, without mitigating upstream behavior. Another unfortunate form of compartmentalization occurs when social justice and environmental or climate concerns are pitted against each other, rather than understood as effects of the same cause. Combet and Hourcade view the separation of different environmental and social problems such as energy transitions and social security provisions as quixotically pitted against each other in a zero-sum game rather than multisolved together as a prime example of “intellectual compartmentalization” [27].

Like a psychological Jevon’s paradox, moral accounting can even make the underlying problem worse, as people feel justified to continue engaging in anti-environmental behavior elsewhere, when they are convinced that they have achieved some good in one realm [28]. For example, because I do not drive, I can trade-off those saved emissions by flying. Attempting to get people to buy or use something the normally wouldn’t, because it is electric, organic, or recycled, even when the fundamental make-up of the item is fundamentally unnecessary or unsustainable, shows greenwashing to be an instantiation of moral accounting [29]. Whereas greenwashing is definitionally intentional, compartmentalism occurs behind the backs of regulators, corporations, and consumers.

Compartmentalization is an institutionalized, embedded practice of making sense of the world through splitting benefits and costs into separate accounts, while greenwashing includes deliberate subterfuge. Nonetheless, slicing coupled events into separate, incommensurable units in order to manage tragic or irreconcilable facts and reduce the ensuing overwhelming emotional and rational reaction is an understandable psychological and societal defense mechanism, disassociating necessarily associated consequences.

Unless overall standards increase, we are apt to compensate for carbon reductions in one area by increasing them in another. This sort of whack-a-mole behavior can be found, for example, in the shift from incandescent to LED lighting delivering significantly less energy used per light, but seeing these savings ‘spent’ through a proliferation of light pollution, embedding LEDs everywhere ranging from aesthetic purposes to replacing the sun to grow food, based on their perceived low energy consumption [30]. This is a classic case of Jevons’ paradox, or rebound effect with energy efficiency. We argue that compartmentalization operates similarly to moral accounting, and thus compartmentalization constitutes a form of circumscribed moral accounting on the personal, group, and structural levels.

Through compartmentalization, instead of viewing eco-positive actions as parcel of a greater suite of actions, they stand-in as justifications for continued fossil fuel use and extraction. Carbon savings here become excuses for expanding spending there. Such narratives are promulgated by the worst polluters [18,20,31]. In some respects, compartmentalization qua siloing is parallel to ‘distantiation,’ the act of displacing the externalities of decisions in space and time, in order to not reckon with them [32].

One way in which climate denial continues is through compartmentalizing rather than coordinating different actions and agencies of state and private industry. While compartmentalization has been previously discussed in observations of climate disinformation [33–35], inter-industry comparisons on this aspect of denialism are rare. Yet, as denialism becomes more refined and less bombastic, it also becomes more institutionalized [2]. Status quo measurement constraints of major scientific bodies are increasingly politicized, affecting how

they account for costs and benefits [36]. This results in sandboxing risk analyses, permitting companies and governments to tout their green credentials while obscuring their much larger extractive enterprises.

Compartmentalization is not restricted to transnational corporations. Governments too are often involved in the process of receiving scientific information and then proceeding to willfully ignore or contravene it [7]. Following Lewis Mumford, Fabian Scheidler names the confluence of state and industry interests the “megamachine,” a unit of power that would not exist without both seemingly independent but co-dependent entities together shaping the material and ideational world we live in [37]. When different megamachines, or government-industry units are pitted against each other, as we currently experience in a multipolar international political system, this can produce arms races, where striving for comparative advantage may lead not only to increasingly rapacious extraction strategies, but also actively enlarging our blind spots in order to justify the collateral damage of accelerated extraction and pollution [38]. Current international system architecture rewards the production of ignorance if this temporarily grants an upper hand or allows more rapid comparative extraction rates. Such dynamics necessarily create ramifying harms themselves often too messy to deal with properly, which in turn pressures further dissonance and downplaying of the gap between words and actions, leading to culminative crisis backlog and overwhelm [14].

The climate denial machine presents itself through different facets: sectoral, narrative, political, behavioral and structural. Sandboxed CSR aiming to prove cooperation to secure the social contract works on both a state and corporate level. The appearance of climate policy reform without actually delivering on the backlog of needed changes can deflate public opposition and reduce solidarity with those directly affected from intensified megamachine extraction [2,39]. For example, being a Signatory of the Paris Agreement buys credibility, but not investing commensurately fails to achieve a 1.5 °C world [40]. Nonetheless, governments continue to tout their commitments in legalistic and theoretical terms. Likewise, oil companies have asserted carbon neutrality targets (while avoiding including Scope 3 emissions), but then have subsequently about-faced, serially abandoning their previous aims when political winds changed and oil prices rebounded [41].

Climate denial can be viewed as a subset of other forms of industry denial which aim to protect profits at the expense of public health and the environment [42–44]. Inter-industry epidemics of chronic disease through environmental harm operates according to networked mechanisms, including the “product defense industry” comprised of lobbyists, public relations firms, marketers, astroturf industry-funded fake grassroots citizens and trade groups, marketers, consultants, lawyers, and other hired guns to protect industry profits through controlling the frame of reference society views industry and its harms [20]. Industries would not be able to operate without this exoskeleton. Thus, we examine not just the machinations of the fossil fuel industry, but also the agrochemical industry, and other extractive and polluting industries that substantially contribute to climate change and chronic disease. Conceptualizing the services of the product defense industry as a package, rather than referring to the different elements of the corporate exoskeleton is itself an intervention in de-compartmentalizing the relevant actors and their networked processes, to better understand coordinated climate denialism.

3. Burdens and origins of compartmentalization

Compartmentalization can be thought of in its simplest terms as an accounting problem: it isolates the benefits in a specific sector while deemphasizes the costs, maintaining their impacts separated from other sectors suffering from similar processes. For example, we can identify different forms of greenwashing as an attempt to hide the true environmental impact

of a product or service. But how these benefits are highlighted and the costs occluded, not just in that particular product, but also *between* products from juice to gasoline, is part of the larger impetus of compartmentalization. Compartmentalization contains greenwashing, but greenwashing does not encompass compartmentalization. This broader category contains not only greenwashing but other forms of strategic omissions and selective disclosures. It overvalues climate declarations and pays less attention to follow-through. This permits shifting the legibility of the full de-siloed accounting of costs and benefits of a company or government's impact towards a more rosy outlook than actually exists. By making the problem more containable than it is, solutions like “net zero by 2050” become convenient commitments that do not require the hard work of actually facing the problem, through postponing real dangers by displacing responsibility onto future generations [3].

This naturalization of cynicism is encapsulated in David Michael's claim that “[m]ost people, especially Americans, have come to expect corporations to demonstrate mercenary behaviors” [20]. By attending to the “social organization of denial,” we become aware of hyped half-measures which will not accomplish ambitious climate goals, and take dissimulation for granted [45]. Such social cues are as much about what topics we should pay attention to as what we ought to avoid or actively fail to acknowledge [46].

In his *Theory of Communicative Action*, Habermas diagnoses two ideal types of communication, those motivated by mutual understanding (emancipative), versus strategic communication (instrumental rationality) [47]. The first type has truth as its object, the second aims to succeed, even at the cost of truth. The sandboxing of these two types of rationality is too convenient, too facile for real life. Nonetheless, acknowledging that all communication and rationality fall on a spectrum between achieving bounded aims even in the face of opposition, and the unforced search for truth involving comparison of sincere perspectives to allow outcomes and trajectories to organically develop, is indeed pertinent to analyzing industrial communication [48]. If instrumental reason—of which compartmentalization is a type—is “parasitic” to reaching understanding, as Habermas supposes [47], then disambiguating motivated reasoning from truth-seeking reasoning (i.e., the traditional social scientific method) is important for better understanding, and quarantining, denial.

Motivated reasoning makes it easy to believe that problems aren't as bad as otherwise described, and makes self-deception easier without noticing [49]. The errors which moral psychology has identified, such as the various prevalent types of cognitive biases, can help develop reflexivity around convictions. According to Adrian Bardon, in his book *The Truth About Denial*, compartmentalization is a “cognitive judo move on dissonant beliefs and feelings: When we compartmentalize, we somehow manage—at least temporarily—simply to avoid thinking about one side of the inconsistency in our beliefs and behavior” [28]. Compartmentalization has developed into a well-orchestrated tactic of asymmetry to avoid having to confront information that might lead to cognitive dissonance. It neatly orders the world, obviating the ways in which various factors have common origins, or supervene upon one another. The aim of pointing out how compartmentalization works is that those not completely in denial can become aware of inconsistencies previously rendered invisible.

To provide examples explored later in this article, government regulatory agencies rarely consider the interactions of an active chemical together with its adjuvants, surfactants, and other admixtures in the ‘cocktail’ of chemicals as they are actually applied in commercial formulations [50,51]. Taking a systems perspective, we benefit from knowing the full range of chemical interactions in the wild, so that we can focus on biocompatible chemical use and transition away from harmful pollutants. Another example can be found in ecophilanthropy; investments such as the Amazon Fund, or Loss and Damages Funds, often comprise a drop in the bucket compared to those same philanthropic countries' extractive investments [52].

Governments and corporations tend to invest in sustainability as flagship projects, but these investments are often dwarfed by their less touted extractive investments. These beacons of ecological stewardship are supposed to signal that indeed governments and corporations take climate *very seriously* and are committed to being ‘part of the solution.’ However, more often than not, such commitments are anomalies and even distractions, rather than representative of incipient projects leading to thoroughgoing reforms. Finding ways to rationalize and balance these parallel extractive and climate investments to de-silo sustainability accounting is imperative to increasing legibility into our actual revealed priorities and commitments.

Responsibilization of climate costs onto consumers is another method of compartmentalization. Foisting the responsibility for climate outcomes on consumers creates additional burdens for citizens, simultaneously unloading responsibility from industrial actors and governments which provide the choice architecture we are confronted with. As Nora MacKendrick has convincingly argued [53], the burden of deciding which product is the least harmful to the environment, and then paying extra for the sustainability premium that seems to have been established (a *de facto* tax rather than a rebate, which would be the case under a carbon tax), one veritably needs a PhD in sustainability and a full bank account to function as a responsible consumer. This burden of unsustainable default commodities is a form of compartmentalizing food systems and information.

A major problem of compartmentalization occurs through treating different industries that contribute to climate change individually. Researchers and policymakers avoidably take tailored approaches in each case [20,54]. While understandable according to one definition of precaution, applying the principle of charity to industry communications may be unwise. As former director of the US National Institute for Environmental Health Sciences Linda Birnbaum has cautioned, regulators erroneously too often take industry studies “at industry’s word,” with misplaced sincerity [55]. Limiting the transferability of industry drivers does not hold up to scrutiny. As the comparative industry database *Smoke and Fumes* reveals, the tobacco industry and the fossil fuel industry have traded strategies to deflect regulation, science-based policy against their products, and public dissatisfaction for nearly a three-quarters of a century [56]. It may be instructive, then, to learn how the tobacco industry conceived of compartmentalization, and what it buys for the industry (Fig 1).

Deliberately bypassing the rational faculties of consumers, Philip Morris (PM) sought to “connect emotionally” with people concerned about the carcinogenicity of its products, in order to assuage health concerns, bolster the industry’s flagging reputation, and distract customers with the company’s corporate social responsibility efforts. By creating “Positive Non-Tobacco Messages” on topics utterly unrelated to tobacco, the industry aimed to maintain control of their social license through diversion [57]. “For most” people who might have concerns with smoking or the company, “Hunger Relief, Domestic Violence, Disaster Relief, Arts, Employee [sic] Volunteerism... these are the messages that allow them to compartmentalize and see the many dimensions of PM,” their advertising strategy suggested. By baiting-and-switching critical attention onto their good deeds, PM sought to provide people excuses to suppress their concerns by providing an illusory broader context of the tobacco company as a responsible corporate citizen [58]. More than mere greenwashing or whitewashing, by bringing attention of good works on completely unrelated issues, positive associations with the company would legitimate good feelings about smoking. Philip Morris’ strategy is not an isolated incident, but indicative.

Industries aim to partner with public agencies like non-profit organizations (NGOS), universities, science centers, and government regulatory agencies to drive scientific agendas and raise their profile through association with high-reputation institutions and causes. This form of reputation washing often occurs through industries engaging via their foundations or philanthropic arms, keeping the polluting business at arm’s length (a form of organizational compartmentalization). However, advertisements of such goodwill-generating philanthropy, are often made

What the Advertising Has To Do...

- Fight Fire With Fire
 - We have to connect emotionally to these people, because the issue is emotional
- Focus on the Present/Future in a Positive Way
 - An acknowledgment or apology about the past doesn't help us
 - Prevents many consumers from compartmentalizing
 - It's confusing to those who are neutral to begin with ("why would they bring that up?")
 - It's a moot point to those with a positive impression (they already have dealt with it)
- Deliver Multiple Messages
 - There is no one "silver bullet", but most people have their own "silver bullet"



Two Types of Messages are Needed...

- Positive Tobacco Messages (We Card support, Accommodation)
 - For some, we have no permission to talk about anything else until/unless we talk about what we're doing here
- Positive Non-Tobacco Messages (Hunger Relief, Domestic Violence, Disaster Relief, Arts, Employee Volunteerism)
 - For most, these are the messages that allow them to compartmentalize and see the many dimensions of PM

12

2078235976

Fig 1. Compartmentalization as tobacco industry tactic to distract from health harms of cigarettes [57].

<https://doi.org/10.1371/journal.pclm.0000552.g001>

through companies' main polluting businesses, touting wholesome partnerships and playing up their ecological stewardship. Adams calls these "chains of engagement... which function as an influence conveyer-belt between industry and policy makers" as well as the general public [59]. By making investments in scientific pursuits positioned to benefit them, industry masks the political ends and ultimate return-on-investment (ROI) such "partnerships" and associations obscure.

In times of scarcity for funding for scientific or charitable work, willingness to bend increasingly towards the strategic interests of industry in exchange for payment is a symptom of desperation in researchers and NGOs [60]. By claiming that there are no strings attached (a form of funding compartmentalization that belies the expectations for continued industry-benefiting outcomes or else lose grant renewals), or that scientists are just being funded for research they would have done anyhow, fails analysis [61,62]. By funding *this* rather than *that*, industry can direct research towards their interests and away from findings which would jeopardize their social license [63,64]. This allows industries to direct research agendas to narrow, non-generalizable research that occludes complex interactions; in effect, compartmentalizing science.

If portioning out concern allows us to bypass acknowledging interacting complexities which would drive upstream interventions on climate, then it is no wonder that managers "interpret the issue within the dominant paradigm of business growth and expansion, [and

thus] compartmentalize ‘climate change’ as a fringe issue,” taking a back seat to growth and profit [65]. Such compartmentalization allows for a focus on “carbon tunnel vision” as the only variable companies aim to track or mitigate [66]. Such reduction of complexity allows us to get a cognitive grasp on issues requiring ambiguity and wisdom rather than the certainty that comes with engineering. Compartmentalizing our problems with climate gets in the way of actually solving them in their full complexity, and becomes even worse when additional power asymmetries are at play.

4. North-South dynamics exacerbating climate denialism compartmentalization

Contemporary structures and discourses comprising the climate denial architecture have their antecedents in historical colonization, when European nations intensively exploited other parts of the world to obtain raw materials and vie for supremacy [67]. Because of this history of extracting from colonial peripheries to feed resources to imperial centers, climate denial occurs differently in the Global South, uniquely enabling polluting practices [9].

Colonialism played an important role in fostering underdevelopment in the Global South. Rather than preexisting poverty, the Global South was impoverished by slash-and-burn economics bringing their riches from global peripheries to colonial centers, depredating cultures and ecologies and reshaping people through imported political institutions [68–71]. According to Hickel [52], the current narrative of post-colonial innocence, indicated by bracketing the structural harms and resource depletion caused over the centuries by colonial powers, is premised on the assumption that patterns of extraction ended with the withdrawal of colonial troops. Today, global and postcolonial state economies are assumed to operate as meritocracies with a level playing field. This version of history, unsurprisingly, is refuted by current global commodity chains, “wherein Northern firms deploy monopsony and monopoly power to depress Southern suppliers’ at every node, from extraction to manufacture, while setting final prices as high as possible” [52]. The “myth of modernity” that underdeveloped nations benefit from the technological modernity achieved by industrialized nations [68], focuses on economic and technological progress to justify exploitation by framing ecological damage as the price of progress [72,73].

Modernization justifications minimize and conceal environmental damage caused by extractive enterprises and compartmentalize harm by creating legitimacy and allowance. Climate denial abets an unnoticed system where polluting enterprises can be carried out without barriers or negative perceptions. By detaching harmful activities from their actual impacts of ecological degradation through perception management, development trajectories are presented as guideposts for underdeveloped countries to reach the industrialization level of developed nations [72]. The promise of equal status in international politics becomes a carrot dangled always out of reach, carrying catastrophic environmental consequences.

The myth of modernity reframes ecological degradation as a necessary means towards progress [72,74]. One way in which parvenu development trajectories are promised but made off-limits is through the imposition of high value-added taxes on the importation of manufactured goods from the Global South, keeping the Global South locked into a race to modernize without the ability to do so, as asymmetrical tariffs ensure developing countries must rely on raw materials as their main exports to the Global North [75]. By creating impossible conditions for achieving economic inclusion, climate harms as instruments towards development become the means justified by delayed or never-arriving ends. Global North-South asymmetries in development based on historical colonialism result in odd combinations of discourses of prosperity through environmental instrumentalization as seen regarding pollutant enterprises carried out in Brazil.

5. Compartmentalization in Norwegian extraction and ecophilanthropy in Brazil

The myth of modernity is visible in the operations of transnational corporations in impoverished postcolonial regions in the Global South such as Brazil, offering industrial investments, jobs, and technological advancement. Unlike other polluting activities carried out by national enterprises, transnational extraction compartmentalizes harms across a spectrum of legitimacy and validity separated by long commodity chains.


During Brazil's military regime (1964–1986), the government's plan for progress focused prominently on exploiting natural resources, especially those located in the Amazon rainforest (Fig 2) [76,77], favoring foreign investment [78]. Following this framework of advancing Brazil's technological progress through industrialization, Norwegian companies have also contributed to polluting sensitive biomes like the Amazon rainforest. Norsk Hydro, a mining company partially owned by the Norwegian government (34.26% of shares), lists the Ministry of Industry and Fisheries and Folketrygdfondet as major shareholders [79]. Norsk Hydro has been involved in severe toxic waste pollution at the Alunorte bauxite refinery in the Amazon rainforest [80–84]. Investigations into the companies' activities, particularly illegal discharges of toxic waste and deterring inspections, suggests double standards in Norsk Hydro's environmental compliance in Brazil compared to Norway, where stricter regulations are followed [85], based on the 2016 Norsk Hydro Annual Report stating that “emissions for Hydro's Alunorte refinery relate mainly to steam generation, which relies on coal and heavy fuel oil. The plant emits about 3.8 million metric tons of CO₂ per year” [85,86]. Local Brazilian communities through the Brazilian's Victims Association (CAINQUIAMA) have successfully sued the company for employing unnecessarily hazardous extraction and smelting processes, contrasting the situation in Barcarena to Øvre Årdal, Norway, where since 2011 Norsk Hydro has employed special technologies to “remove sulfur dioxide (SO₂) from the flue gas from aluminum production,” consequently, “reduc[ing] annual emissions of SO₂ from the technology center by 200 metric tons” [87]. Nearby indigenous and quilombos communities reported that due to environmental pollution from the company's operations, many residents suffered illnesses such as diarrhea, vomiting, and itching; animals died; their livelihood and culture lost their ecological moorings; and the water tasted “like perfume” [82,88].

On May 10, 2024, a Brazilian court ruling in Pará found the company liable for excessively polluting the region [85]. This decision was strengthened by another ruling issued by the Brazilian Federal Justice on July 10, 2024 condemning the company for leaking toxic waste in 2009 [89]. This decision recognizes that the refinery was involved in illegal dumping. Both decisions are still subject to appeal.

Norsk Hydro has operated in Brazil since the 1970s, originally endorsed by Brazil's military regime [90–93]. In spite of the company's systematically substandard environmental measures taken in the country compared to other countries with more closely scrutinized environmental standards, the Norwegian government itself is implicated in the collateral damage of these unwarranted environmental hazards [94,95]. On one occasion when Norsk Hydro was accused of environmental misconduct in Brazil, even after the company publicly admitted that it had deliberately discharged toxic waste into the river, Norsk Hydro's Norwegian manager in Brazil, John Thuestad, defended their practices as justified by their contribution to development: “the region needs an industrial locomotive like [Norsk] Hydro” [96]. Thus, progress—however nebulously defined, and no matter which groups benefit from the irreversible raw material extraction—becomes framed as worth any cost, including environmental pollution and the subsequent health harms.

Norway is one of the most environmentally-committed countries and is the largest contributor to the Amazon Fund to protect Amazonian rainforest. Yet, extractive investments by

**PARA UNIR
OS BRASILEIROS NOS
RASCAMOS O
INFERNO
VERDE**



O Brasil progride.
O Brasil quer seu povo
unido, trabalhando
e confiante.
O governo federal
promove o
fortalecimento dos
homens e de
seus ideais.
A Construtora Andrade
Gutierrez S. A.
participa deste
esforço de afirmação
nacional: é a pioneira
nas grandes obras
rodoviárias de
integração da Amazônia.

ANDRADE-GUTIERREZ

**CONSTRUTORA
ANDRADE
GUTIERREZ S. A.**
* Belo Horizonte
* Rio de Janeiro
* São Paulo * Manaus
* Belém * Curitiba
* Recife

Rodovia Manaus—Pôrto Velho
(BR-319) — Do Amazonas à
Rorônia, em 850 quilômetros,
dos quais 470 já concluídos
— O maior contrato
rodoviário firmado por uma
única empreiteira.

Fig 2. “To unite Brazilians, let’s tear up the green hell!” Advertisement by Andrade-Gutierrez construction agency. (Note: The cover showcases one segment of the Trans-Amazonian Highway). In *Manchete*. February 1973. Special Edition on the Amazon: “A new Brazil” [97].

<https://doi.org/10.1371/journal.pclm.0000552.g002>

the same country (Norway) in the same region (Brazilian Amazon) far outweigh in monetary terms and environmental damage their laudable sustainability philanthropy. Scenarios of climate denialism strategy involving economic relations between the Global North and the South, such as Norwegian investment in Brazil, shed light on compartmentalized plans of action and discourse in different regions of the world. These asymmetric extractive/protective investments from enterprises courting public approval and social license, can be understood as a form of climate denialism (assuming that state-sponsored ecophilanthropy is not an intentional distraction technique). Without balancing accounts across government agencies, environmental devastation by state-owned companies operating in Brazil are diluted by ecophilanthropic imaginaries like the Amazon Fund supported by the Norwegian government. Compartmentalization, here understood as differential environmental standards applied according to what companies and governments believe they can get away with according to prevailing legal and social structures in a given country, suffers from split ledger accounting which quarantines environmental damage from ecophilanthropy goals, enabling excess ecosystem destruction and environmental injustice.

6. Compartmentalization in chemical policies

Investigating harms one chemical at a time also reduces environmental health, unduly slows progress and obscures pattern recognition through compartmentalization. Regulatory bodies rarely analyze products according to their commercial formulations [98]. Instead, regulatory frameworks often concern themselves solely with the “active” ingredients companies list on their products, despite the fact that chemical admixtures often pose greater risks [51]. Analyzing only stated active ingredients in pesticides, for example, excludes the surfactants, adjuvants, and other additives in commercially available formulas. While chemical registries have matured in predicting adverse interactions applying machine learning to chemistry—including the Bioregistry: Registry Search Tool for Interactions of Chemicals, BioGRID: Database of Protein, Chemical, and Genetic Interactions, and ChemDIS-Mixture—knowledge from these databases has yet to be sufficiently integrated into chemical regulatory policy [25,99,100]. Admixtures also are not checked for the additional problems they may present regarding their potential dysergistic ecological harms resulting from emergent chemical formations. Such a “whack-a-mole” approach to chemical regulation means that chemical regulation perennially lags behind chemical development and deployment [25,101,102].

Regulatory frameworks appraise chemical toxicity in isolation, rarely considering dysergistic effects either from emergent chemistry or ecotoxic effects. Especially since multiple chemical exposures often affect populations with the least amount of political and economic purchase, their injuries become more difficult to detect epidemiologically due to preexisting social inequalities [103–105]. Exacerbated inequalities through increased chemical burdens building on disempowerment [106] are furthered through what Andrew Szasz calls the “political anesthesia” involved in selling premium personal solutions to collective action problems [107]. The unequal exposures and protections against toxins constitute a form of compartmentalization [108], with elite sectors of the population perceiving themselves as no longer beholden to improving the default options when they can simply buy “personal commodity bubbles” to privately insulate themselves from the chemical-filled commons [107]. In this case, compartmentalization appears as a politics of separation, where interconnected issues are interpreted as discrete. Such framing enables ignorance of certain types of risk common across different disconnected categories.

Scientifically, *in situ* versus *in laboratorio* compartmentalization occurs when laboratory conditions are (erroneously) deemed sufficient models of actual exposures. A classic example

of this is the discrepancy between exposures of the herbicide glyphosate to frogs in hermetically sealed laboratory conditions versus in the presence of their predators in the wild. In their paper “Predator cues and pesticides: a double dose of danger for amphibians,” the authors found that in previous laboratory studies, exposing frogs and other amphibians to glyphosate did not substantially harm them; thus Monsanto trials could conclude the safety of applying the herbicide to crops adjacent to riparian environments [51]. However, when Relyea et al attempted to add in elements from the wild in their laboratory experiment (in this case, the presence of snakes, frogs’ predators), fear of the predator induced a suppressed immune response causing the same frog species to become 15 times less resilient to glyphosate exposure, carrying serious developmental and health effects previously uncatalogued [109–111]. The ramifications of minimally complex research are clear in their lack of robustness. The European Parliament’s Report of the Special Committee on the Union’s authorization procedure for pesticides, for example, has stressed the importance of “conduct[ing] an epidemiological study on the real-life impacts of plant protection products on human health,” rather than relying on single-pathway, single-chemical isolated ersatz studies [112]. Discrepancies between *in vitro* and *in vivo* exposure is one way in which pesticide harms are compartmentalized.

The compartmentalization of risk includes what is deemed “acceptable” risk (Fig 3). With chemical policy, governmental agencies such as the European Food Safety Authority (EFSA) and the United States Environmental Protection Agency (EPA) tend towards a safe-until-proven-toxic approach, rather than a toxic-until-proven-safe model [33]. The capture of chemical policy by the chemical industry has downplayed real risks, paradoxically, making

Precaution vs. No Caution in Chemical Policy

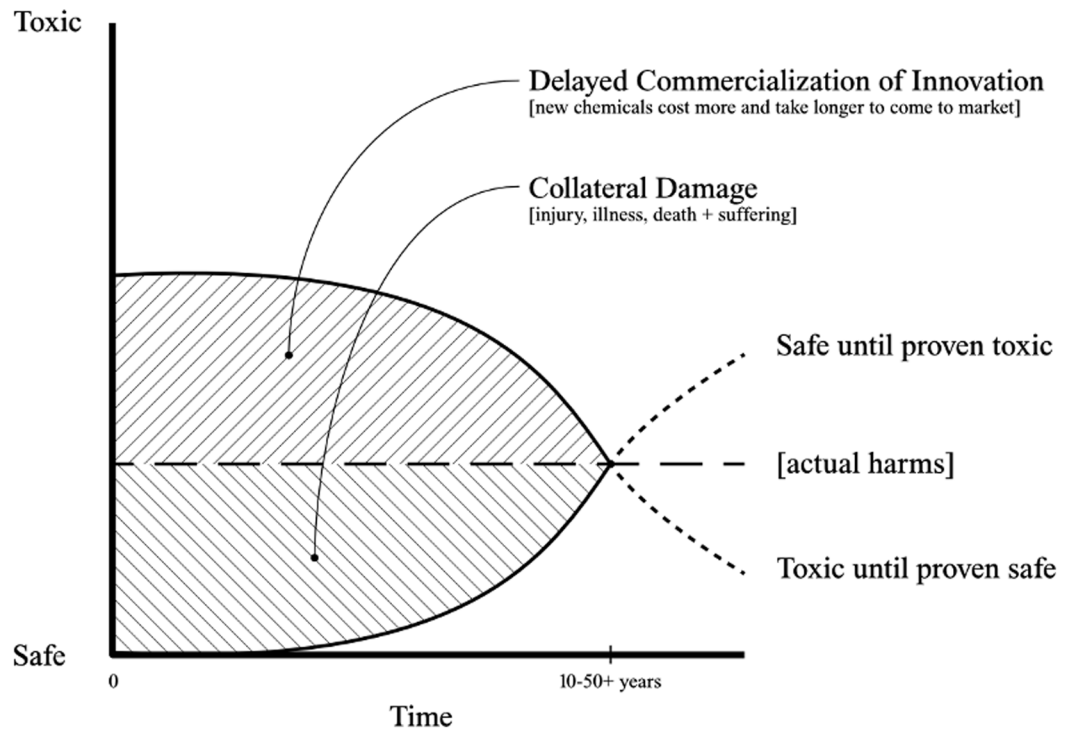


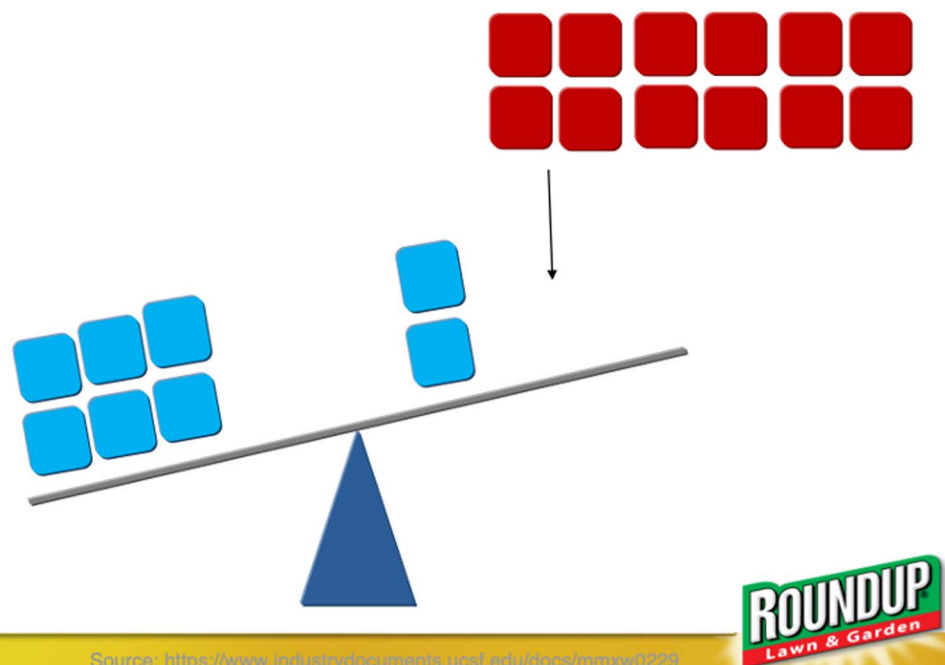
Fig 3. Precaution vs no caution in chemical policy.

<https://doi.org/10.1371/journal.pclm.0000552.g003>

hazard assessments more representative than risk assessments of actual exposures [113–116]. In the case of the 2015 International Agency for Research on Cancer (IARC) glyphosate hazard assessment, which found glyphosate to be a class 2A carcinogen, almost immediately this finding was rebutted by coordinated risk assessments both by EFSA and EPA deflecting these claims. This discrepancy is explained in part because EFSA and EPA assessments favor industry studies, while IARC favors independent peer-review literature. To avoid industry influence, compartmentalization via industry contamination may be an important element for including in future risk assessments.

The glyphosate case study is instructive because it shows how quarantining independent research from industry-sponsored scientific research can protect against motivated science, which can lead to inaccurate and irresponsible chemical policy, which may greatly harm humans and the environment through direct and dysergistic effects only discovered long afterwards. As is now known through documents revealed from the discovery process of lawsuits, Monsanto (now Bayer) sought to literally put a finger on the scales of scientific assessments of glyphosate by loading the preponderance of evidence with pro-glyphosate industry-funded studies concluding the benign effects of glyphosate (Fig 4) [117]. Chemical companies like Monsanto were not just interested in influencing science in one domain of scientific contention, but sought to dominate science aimed to influence consensus on the genotoxicological, epidemiology, animal and mechanistic toxicology, mechanism of action,

All about winning the argument.....



Source: <https://www.industrydocuments.ucsf.edu/docs/nmxw0229>

Fig 4. L&G reputation management session summary. Lyon, February 2014. Prepared by Wim Engelen [117].

<https://doi.org/10.1371/journal.pclm.0000552.g004>

exposure, and other types of studies [118]. This ‘quantity over quality’ mode of science Monsanto pursued can disarm scientists’ and policymakers’ critical faculties. If we take all scientific studies to be equal, then it does not matter whether the authors of studies have a financial conflict of interest or not. By dismissing conflicts of interest as marginal, rather than determinative to study outcomes (which has been empirically confirmed in at least three industries) [119–121], we arrive at a postmodern science where quality gives way to quantity and other easily gameable technological aspects of professional delivery (including hype, scientific sensationalism, but also expensive certified laboratory standards originally meant to ensure industry science matched university science but more recently weaponized against university researchers). The politicization and undermining of scientific quality, and attempt to detach the necessary combination of empirics and judgment which goes into questions of scientific merit and consensus destroys the epistemic foundations of the scientific enterprise.

Environmental advocates can fight these forms of climate compartmentalization by requiring all exposures to be taken into account in hazard assessments; to not dismiss hazard assessments in favor of risk assessments, especially if risk assessments are conducted or influenced by industry; and, to look at the full range of harms. Just as there are enough rare earth minerals for minimalist electric cars and e-bikes, but not for 9,000 pound, 1,000 horsepower electric Hummers (the difference between conservative versus intensive use of lithium for mobility making up to a 92% differential in lithium demand) [122], so too the climate effects from chemicals can only be understood when we take all variables into account.

7. Discussion and conclusion

In Medieval Europe, the practice of indulgences allowed rich sinners to be exonerated through paying danegeld to the Catholic Church. These pardons allowed sinners to continue sinning, enabled their behavior, and prevented the type of repentance which could actually lead to abating their sacrilegious behavior. Our current climate response banking on carbon offsets, most of which do not actually end up offsetting in any meaningful way the offending activity [123,124], institutes a wealth transfer from the guilty to the grifters willing to set up a convincing enough illusion that they are exonerating carbon sins with tree planting, conservation, or other practices that usually fail to come close to actually compensating the offending activity.

By working through companies as intermediaries, states distance themselves from environmental harm and toxic fallout for local populations elsewhere. Hidden by the cloak of business, states avoid international conflicts, and instead offer displays of disapproval and approbation to proxies. This pathos of distance displays a mode of compartmentalization that allows foreign companies to continue plundering the Global South at high costs to our climate without direct responsibility [125].

Rather than a single driver, compartmentalization results from convergent actions and discourses that maintain artificial boundaries between harms and benefits, oversell environmental bona fides, and fail to mention the full chain of exposures or pollutants, to engage in harmful practices covered by environmental disguises. Compartmentalization has been presented as a new way of framing certain denial strategies which become institutionalized along various dimensions—how we judge the toxicity of chemicals, how we make sense of corporate and state (eco)philanthropy alongside extractive harms, and how companies engage in environmental arbitrage—examples of a more generalized accepted tendency of siloing the accounting of different corporate and state bureaucratic practices between protection and harm, leading effectively to climate denial.

Shame can be a useful motivating force, especially for corporations whose license to operate depends upon continued social approval and acceptability of the corporation and their behavior [126]. When companies behave poorly, environmental organizations like

the Rainforest Action Network have successfully launched long-haul campaigns against standard-bearer corporations like Burger King to stop sourcing rainforest beef, shaming ecologically destructive corporations into realizing that society will scrutinize their ecological values and drive change (even if their actual pivots leave much to be desired) [127,128]. Taking the perspective of Luhmann's social systems theory [129], non-governmental organizations and social movements play vital societal roles in *de-compartmentalizing* end products (hamburgers) from the climate changing commodity chains to which they are accomplice (rainforest-destroying livestock), deploying boycotts and other financial modes of shaming to make ecological harms economically legible.

Climate injustice is exacerbated by compartmentalized views of environmental issues. Without addressing the preexisting social inequalities which allow for harming people and environments at a distance (geographically or socially), the climate movement will have a difficult time addressing the multithreaded problems that must be solved simultaneously [103,130,131]. Compartmentalizing climate as a CO₂ issue, or as bracketed from its social injustice drivers, unnecessarily prevents alliances from forming, hobbling climate justice movements which build upon genuine solidarity. Selecting for environmental sustainability on a wider rather than narrower view requires taking the full ramifications of policy choices into account with each action. This decompartmentalizing strategy, known as "multisolving," allows for maximizing the efficacy of interventions through addressing the known relevant aspects of the problem together, at once, rather than fighting uphill policy battles for each one separately, without the support of beneficiary coalitions [132].

Compartmentalization has been defined variously in different disciplines, but the overriding commonality turns on the axis of acting as if one relevant aspect can be separated from another. No matter their philanthropic investments in algae, hydrogen, ammonia, or whatever technology they think can become their next monopoly, fossil fuel companies cannot be responsible corporate citizens as long as they continue to stochastically kill millions of people through continued emissions which they fight to perpetuate [133–136]. Humanity's survival is predicated on making explicit and salient the hidden and complex harms concealed to manage corporate and state status quos. To the extent that we can better see and understand the real complexities involved in pollution at all levels, the climate denial machine will have fewer alibis, and fewer places to hide.

Author contributions

Conceptualization: Yogi Hale Hendlin, Fernando Procópio Palazzo.

Funding acquisition: Yogi Hale Hendlin, Fernando Procópio Palazzo.

Investigation: Yogi Hale Hendlin.

Supervision: Yogi Hale Hendlin.

Writing – original draft: Yogi Hale Hendlin, Fernando Procópio Palazzo.

Writing – review & editing: Yogi Hale Hendlin, Fernando Procópio Palazzo.

References

1. John R. New evidence reveals fossil fuel industry sponsored climate science in 1954. DeSmog. 2024 [cited 2024 Feb 9]. Available from: <https://www.desmog.com/2024/01/30/fossil-fuel-industry-sponsored-climate-science-1954-keeling-api-wspa/>
2. Mann ME. The new climate war: the fight to take back our planet. New York: Public Affairs; 2021.
3. Levantesi S, Mann ME. How "inactivists" have quietly perpetuated climate change denial. Il manifesto global. 2021 [cited 2024 Feb 15]. Available from: <https://global.ilmanifesto.it/how-the-oil-industry-quietly-continues-to-deny-climate-change/>

4. Lamb WF, Mattioli G, Levi S, Roberts JT, Capstick S, Creutzig F, et al. Discourses of climate delay. *Glob Sustain* [Internet]. 2020 ed [cited 2023 Apr 21];3:e17. Available from: <https://www.cambridge.org/core/journals/global-sustainability/article/discourses-of-climate-delay/7B11B722E3E3454BB6212378E32985A7>
5. Aronczyk M, Espinoza MI. *A strategic nature: public relations and the politics of American environmentalism*. New York: Oxford University Press; 2022.
6. Hoggan J, Littlemore R. *Climate cover-up: the crusade to deny global warming*. Vancouver: Greystone Books; 2009.
7. Speth JG. *They knew: the US federal government's fifty-year role in causing the climate crisis*. Cambridge, MA: The MIT Press; 2021.
8. Grasso M, Levantesi S, Beqja S. Climate obstruction in Italy. In: Brulle RJ, Roberts JT, Spencer MC, editors. *Climate obstruction across Europe*. New York, NY: Oxford University Press; 2024.
9. Nixon R. *Slow violence and the environmentalism of the poor*. Cambridge, MA: Harvard University Press; 2011.
10. Melstrom RT, Jones LR, Caviglia-Harris J. Patterns of frontier development: a dynamic model of resource extraction in the Brazilian Amazon. *Environ Dev Econ*. 2016 Jun [cited 2017 Jan 25];21(3):350–70. Available from: <https://www.cambridge.org/core/journals/environment-and-development-economics/article/patterns-of-frontier-development-a-dynamic-model-of-resource-extraction-in-the-brazilian-amazon/103D08315C0FA82AD6FECD7C11CA20E6>
11. Lazonick W, Shin JS. *Predatory value extraction: how the looting of the business corporation became the U.S. norm and how sustainable prosperity can be restored*. 1st ed. Oxford: Oxford University Press; 2020.
12. Perrow C. *Normal accidents: living with high-risk technologies*. 2nd ed. Princeton: Princeton University Press; 1999.
13. Dunlap R, McCright AM. *Organized climate change denial*. Oxford University Press; 2011.
14. Proctor R, Schiebinger LL. *Agnotology: the making and unmaking of ignorance*. Stanford, CA: Stanford University Press; 2008.
15. Proctor R. Agnotology: a missing term to describe the cultural production of ignorance (and its study). In: Proctor R, Schiebinger LL, editors. *Agnotology: the making and unmaking of ignorance*. Stanford, CA: Stanford University Press; 2008. p. 1–36.
16. Reed G, Hendlin YH, Desikan A, MacKinney T, Berman E, Goldman G. The disinformation playbook: how industry manipulates the science policy process—and how to restore scientific integrity. *J Public Health Policy*. 2021;42(4):622–34. <https://doi.org/10.1057/s41271-021-00318-6> PMID: [34811464](https://pubmed.ncbi.nlm.nih.gov/34811464/)
17. Jacquet J. *The playbook: how to deny science, sell lies, and make a killing in the corporate world*. New York: Pantheon Books; 2022.
18. Oreskes N, Conway EM. *Merchants of doubt: how a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. 1st ed. New York: Bloomsbury Press; 2010.
19. Hastings G. *The marketing matrix: how the corporation gets its power and how we can reclaim it*. New York, NY: Routledge; 2012.
20. Michaels D. *Triumph of doubt*. 1st ed. New York, NY: Oxford University Press; 2020.
21. Nesbit J. *Poison tea: how big oil and big tobacco invented the tea party and captured the GOP*. New York: Thomas Dunne Books; 2016.
22. Mayer J. *Dark money: the hidden history of the billionaires behind the rise of the radical right*. New York: Doubleday; 2016.
23. MacLean N. *Democracy in chains: the deep history of the radical right's stealth plan for America*. Reprint ed. New York, NY: Penguin Books; 2018.
24. Fang L. The playbook for poisoning the earth [Internet]. *The Intercept*. 2020 [cited 2020 May 31]. Available from: <https://theintercept.com/2020/01/18/bees-insecticides-pesticides-neonicotinoids-bayer-monsanto-syngenta/>
25. Maffini MV, Rayasam SDG, Axelrad DA, Birnbaum LS, Cooper C, Franjevic S, et al. Advancing the science on chemical classes. *Environ Health*. 2023;21(Suppl 1):120. <https://doi.org/10.1186/s12940-022-00919-y> PMID: [36635752](https://pubmed.ncbi.nlm.nih.gov/36635752/)
26. Johnson SGB, Ahn J. Principles of moral accounting: how our intuitive moral sense balances rights and wrongs. *Cognition*. 2021;206:104467. <https://doi.org/10.1016/j.cognition.2020.104467> PMID: [33129053](https://pubmed.ncbi.nlm.nih.gov/33129053/)
27. Combet E, Hourcade JC. Carbon tax, pensions and public deficits: The hidden costs of the compartmentalization of expertise. In: 3ème conférence annuelle de la GGKP [Internet]. Venice, Italy; 2015 [cited 2024 Jul 1]. Available from: <https://hal.science/hal-01692684>

28. Bardon A. The truth about denial: bias and self-deception in science, politics, and religion. New York: Oxford University Press; 2019.
29. Greer J, Bruno K. Greenwash: the reality behind corporate environmentalism. Penang: Third World Network; 1996.
30. Keith D. LED salad and Jevon's paradox. David Keith's Research Group. 2016 [cited 2024 Feb 18]. Available from: <https://keith.seas.harvard.edu/blog/led-salad-and-jevon%E2%80%99s-paradox>
31. Goldberg RF, Vandenberg LN. Distract, delay, disrupt: examples of manufactured doubt from five industries. *Rev Environ Health*. 2019 Dec 18;34(4):349–63. <https://doi.org/10.1515/reveh-2019-0004> PMID: [31271562](https://pubmed.ncbi.nlm.nih.gov/31271562/)
32. Beck U. Climate for change, or how to create a green modernity? *Theory, Cult Soc*. 2010 Mar 1;27(2–3):254–66. Available from: <http://tcs.sagepub.com/cgi/doi/10.1177/0263276409358729>
33. Arcuri A, Hendlin YH. The chemical anthropocene: glyphosate as a case study of pesticide exposures. *Kings Law J*. 2019 Sep 19;1–20. Available from: <https://www.tandfonline.com/doi/full/10.1080/09615768.2019.1645436>
34. Korfmacher KS. Bridging silos: collaborating for environment, health and justice in urban communities. Cambridge, MA: The MIT Press; 2019.
35. Tuana N. Feminist epistemology: the subject of knowledge 1. In: *The Routledge handbook of epistemic injustice*. Routledge; 2017.
36. Searchinger TD, Hamburg SP, Melillo J, Chameides W, Havlik P, Kammen DM, et al. Climate change. Fixing a critical climate accounting error. *Science*. 2009;326(5952):527–8. <https://doi.org/10.1126/science.1178797> PMID: [19900885](https://pubmed.ncbi.nlm.nih.gov/19900885/)
37. Scheidler F. The End of the megamachine. Ridgefield, CT: Zero Books; 2020.
38. Schmachtenberger D. “Bend Not Break Part 5” | The Great Simplification #50 [Internet]. 2022 [cited 2023 Mar 24]. Available from: https://www.youtube.com/watch?v=Kep8Fi_rUUI
39. Hansen J. Storms of my grandchildren: the truth about the coming climate catastrophe and our last chance to save humanity. Reprint ed. New York: Bloomsbury USA; 2010.
40. Parry I, Mylonas V, Vernon N. Mitigation policies for the Paris agreement: an assessment for G20 countries. International Monetary Fund; 2018 Aug. (IMF Working Paper). Report No.: WP/18/193.
41. Hendlin YH, Weggelaar J, Derossi N, Mugnai S. Being algae: transformations in water, plants. Leiden: Brill; 2024.
42. de Lacy-Vawdon C, Livingstone C. Defining the commercial determinants of health: a systematic review. *BMC Public Health*. 2020;20(1):1022. <https://doi.org/10.1186/s12889-020-09126-1> PMID: [32600398](https://pubmed.ncbi.nlm.nih.gov/32600398/)
43. McKee M, Stuckler D. Revisiting the corporate and commercial determinants of health. *Am J Public Health*. 2018;108(9):1167–70. <https://doi.org/10.2105/AJPH.2018.304510> PMID: [30024808](https://pubmed.ncbi.nlm.nih.gov/30024808/)
44. Hendlin YH, Oreskes N. New library of fossil fuel industry documents provide key ingredient against climate denial and inaction • The Revelator [Internet]. The Revelator. 2019 [cited 2019 Sep 28]. Available from: <https://therevelator.org/fossil-fuel-library/>
45. Zerubavel E. The elephant in the room: silence and denial in everyday life. Oxford; New York: Oxford University Press; 2006.
46. Norgaard KM. Living in denial: climate change, emotions, and everyday life. Cambridge, MA: The MIT Press; 2011.
47. Habermas J. The theory of communicative action: reason and the rationalization of society, Vol. 1. Boston: Beacon Press; 1984.
48. Markovits E. The politics of sincerity: Plato, frank speech, and democratic judgment. University Park: Penn State University Press; 2009.
49. Kahan DM. Neutral principles, motivated cognition, and some problems for constitutional law. *Harv Law Rev* [Internet]. 2011 Nov 15;125(1). Available from: <https://harvardlawreview.org/print/vol-125/neutral-principles-motivated-cognition-and-some-problems-for-constitutional-law/>
50. Kortenkamp A. Ten years of mixing cocktails: a review of combination effects of endocrine-disrupting chemicals. *Environ Health Perspect*. 2007;115(Suppl 1):98–105. <https://doi.org/10.1289/ehp.9357> PMID: [18174957](https://pubmed.ncbi.nlm.nih.gov/18174957/)
51. Hendlin YH, Arcuri A, Lepenies R, Hüesker F. Like oil and water: the politics of (not) assessing glyphosate concentrations in aquatic ecosystems. *Eur J Risk Regul* [Internet]. 2020 Sep [cited 2020 Sep 4];11(3):539–64. Available from: <https://www.cambridge.org/core/journals/european-journal-of-risk-regulation/article/like-oil-and-water-the-politics-of-not-assessing-glyphosate-concentrations-in-aquatic-ecosystems/9DF1C7251DFEEA008BB305583C662F45#fndtn-information>

52. Hickel J, Dorninger C, Wieland H, Suwandi I. Imperialist appropriation in the world economy: drain from the global South through unequal exchange, 1990–2015. *Global Environ Change* [Internet]. 2022 Mar 1 [cited 2023 Jun 17];73:102467. Available from: <https://www.sciencedirect.com/science/article/pii/S095937802200005X>
53. MacKendrick N. *Better safe than sorry: how consumers navigate exposure to everyday toxics*. 1st ed. Oakland, CA: University of California Press; 2018.
54. Michaels D. Manufactured uncertainty: protecting public health in the age of contested science and product defense. *Ann N Y Acad Sci*. 2006;1076:149–62. <https://doi.org/10.1196/annals.1371.058> PMID: 17119200
55. Gillam C. Corporate studies asserting herbicide safety show many flaws, new analysis finds. *The Guardian*. 2021 Jul 2 [cited 2024 Dec 20]. Available from: <https://www.theguardian.com/business/2021/jul/02/glyphosate-herbicide-roundup-corporate-safety-studies>
56. Center for International Environmental Law. *Smoke & fumes* [Internet]. Smoke & Fumes documents. 2016 [cited 2024 Feb 21]. Available from: <https://www.smokeandfumes.org/>
57. Philip Morris. PM21 overview [Internet]. UCSF; 1999 Apr [cited 2024 Jan 18]. (Truth Tobacco Industry Documents). Available from: <https://industrydocuments.ucsf.edu/tobacco/docs/#id=hjpk0043>
58. Hendlin YH, Han EL, Ling PM. Pharmaceuticalisation as the tobacco industry's endgame. *BMJ Glob Health*. 2024 Feb 1;9(2):e013866. Available from: <https://gh.bmj.com/content/9/2/e013866>
59. Adams PJ. *Moral jeopardy: risks of accepting money from the alcohol, tobacco and gambling industries*. Cambridge: Cambridge University Press; 2016. (International research monographs in the addictions (IRMA)).
60. Ritchie S. *Science fictions: how fraud, bias, negligence, and hype undermine the search for truth*. Illustrated ed. New York: Metropolitan Books; 2020.
61. Mandrioli D, Kearns CE, Bero LA. Relationship between research outcomes and risk of bias, study sponsorship, and author financial conflicts of interest in reviews of the effects of artificially sweetened beverages on weight outcomes: a systematic review of reviews. *PLoS One*. 2016;11(9):e0162198. <https://doi.org/10.1371/journal.pone.0162198> PMID: 27606602
62. Grundy Q, Dunn AG, Bourgeois FT, Coiera E, Bero L. Prevalence of disclosed conflicts of interest in biomedical research and associations with journal impact factors and altmetric scores. *JAMA*. 2018;319(4):408–9. <https://doi.org/10.1001/jama.2017.20738> PMID: 29362787
63. Fabbri A, Gilmore AB. *Industry influence on science: what is happening and what can be done*. In: Maani N, Petticrew M, Galea S, editors. *The commercial determinants of health*. 1st ed. New York: Oxford University Press; 2022.
64. Fabbri A, Lai A, Grundy Q, Bero LA. The influence of industry sponsorship on the research agenda: a scoping review. *Am J Public Health*. 2018;108(11):e9–16. <https://doi.org/10.2105/AJPH.2018.304677> PMID: 30252531
65. Nyberg D, Wright C. Climate-proofing management research. *AMP*. 2022 May;36(2):713–28. Available from: <http://journals.aom.org/doi/full/10.5465/amp.2018.0183>
66. Konietzko J. Moving beyond carbon tunnel vision with a sustainability data strategy [Internet]. *Forbes*. 2022 [cited 2024 Feb 21]. Available from: <https://www.forbes.com/sites/cognizant/2022/04/07/moving-beyond-carbon-tunnel-vision-with-a-sustainability-data-strategy/>
67. Reibold K. Settler colonialism, decolonization, and climate change. *J Appl Philos*. 2023;40(4):624–41. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1111/japp.12573>
68. Dussel E. *1492 O Encobrimento do Outro. A origem do mito da modernidade*. Petrópolis, Brasil: Vozes; 1993.
69. Quijano A. Of Don Quixote and windmills in Latin America. In: *Key texts for Latin American sociology* [Internet]. London, UK: SAGE Publications Ltd; 2019 [cited 2024 Feb 15]. p. 64–73. Available from: <https://sk.sagepub.com/books/key-texts-for-latin-american-sociology/i359.xml>
70. Mignolo WD. *La Idea de América Latina. La herida colonial y la opción decolonial*. Barcelona, Spain: Gedisa; 2005.
71. Galeano E. Las venas abiertas de América Latina. *Revista española de la opinión pública*. 1972;(28):495.
72. Silva SR da. *Progresso, modernidade e colonialismo na América Latina. Desenvolvimento e Sociedade*. 2019 Dec 7.
73. Pádua JA. “Cultura esgotadora”: agricultura e destruição ambiental nas últimas décadas do Brasil Império. n.d.
74. Pereira E. *Meio Ambiente e Ditadura no Brasil: a luta contra a Celulose Borregard (1972-1975)*. *Revista de Historia Iberoamericana*. 2014;7:1–20.

75. Hickel J. Global inequality. In: Handbook of economic anthropology [Internet]. Elgar Publishing; 2022. p. 316–30. Available from: <https://www.elgaronline.com/edcollchap/book/9781839108921/book-part-9781839108921-35.xml>
76. Fausto B. História do Brasil. São Paulo, Brazil: Edusp; 1995.
77. Mota CG, Lopez A. História do Brasil: uma interpretação. 4ª. São Paulo, Brazil: Editora 34; 2015.
78. Gasparin F, Rodrigues R. Entre a Noruega e o Guaíba. A história das estranhas relações da Aktieselskapet Borregard e sua filial brasileira. Opinião. 231st ed. 1977 Apr;14–5.
79. Norsk Hydro. Main shareholders [Internet]. <https://www.hydro.com/en-BR/investors/the-hydro-share/main-shareholders/>. 2024. Available from: <https://www.hydro.com/en-BR/investors/the-hydro-share/main-shareholders/>
80. Comissão Parlamentar de Inquérito. Relatório Final. Danos Ambientais na Bacia Hidrográfica do Rio Pará [Internet]. Assembleia Legislativa do Estado do Pará; 2018. Available from: https://www.alepa.pa.gov.br/midias/midias/135_0445fa8da93940afabc5c36edd7ab1e1.pdf
81. Comissão Externa das Bacias de Rejeitos de Mineração em Barcarena/PA. Relatório Final [Internet]. Câmara dos Deputados da República Federativa do Brasil; 2018. Available from: <https://www2.camara.leg.br/atividadelegislativa/comissoes/comissoes-temporarias/externas/55a-legislatura/bacias-derejeitos-de-mineracao-em-barcarena-pa/documentos/outrosdocumentos/relatorio-final-comissao-externa-de-barcarena-com-links>
82. TJPA – Tribunal de Justiça do Estado do Pará. Civil Action 0824887-91.2018.8.14.0301 [Internet]. TJPA; 2018. Available from: <https://consultas.tjpa.jus.br/consultaunificada/consulta/principal#>
83. MPF – Ministério Público Federal. Petição conjunta. Protocolo de entendimentos Hydro [Internet]. MPF; 2019. Available from: <https://www.mpf.mp.br/pa/sala-deimprensa/documentos/2019/peticao-conjunta-protocolo-entendimentos-hydrompf-desembargo-drs2>
84. Dossiê desastres da mineração em Barcarena. Núcleo de Altos Estudos Amazônicos – NAEA/UFPA; 2021.
85. Tribunal de Justiça do Estado do Pará. Civil Action 0824030-11.2019.8.14.0301-1 [Internet]. TJPA; 2019 [cited 2024 Feb 15]. Available from: <https://consultas.tjpa.jus.br/consultaunificada/consulta/principal#>
86. Norsk Hydro. Annual report [Internet]. 2016. Available from: <https://www.hydro.com/globalassets/06-investors/reports-and-presentations/annual-report/ar16/documents/hydro-annualreport-2016.pdf>
87. Norsk Hydro. Hydro to install new environmental technology in Årdal [Internet]. 2011. Available from: <https://www.hydro.com/en-IT/media/news/2011/hydro-to-install-newenvironmental-technology-in-ardal/>
88. Tinha Gosto de Perfume: Barcarena e os Crimes Ambientais Impunes. 2018.
89. Tribunal Regional Federal da 1ª Região. Criminal Case 0015239-52.2019.4.01.3900 [Internet]. 2024. Available from: <https://pje1g.trf1.jus.br/consultapublica/ConsultaPublica/listView.seam>
90. Akerø DB, Hveem H, Pleszynski D, Borge PE. Norge i Brasil. Militærdiktatur, folkemord og norsk aluminium. Oslo: H. Aschehoug & co.; 1979.
91. Vale. Nossa História. Verso Brasil Editora; 2012.
92. Sanders ARD. Grønt metall og rødt slam: Norsk Hydro og Alunorte-saken. 2023.
93. Wanderley LJdM. GT5 - 103 A Ilusão do Progresso e os Custos Ambientais do Projeto Mineração Rio de Norte – Oriximiná-PA. Anais ENANPUR [Internet]. 2007 [cited 2023 Nov 16];12(1). Available from: <http://anais.anpur.org.br/index.php/anaisenanpur/article/view/1284>
94. Norsk Hydro. Hydro-Vale aluminium transaction to be completed today [Internet]. 2011 [cited 2024 Feb 15]. Available from: <https://www.hydro.com/en-NO/media/news/2011/hydro-vale-aluminiumtransaction-to-be-completed-today/>
95. Halvorsen A. Hydro: gigant i Brasils regnskog. 2010 Aug 28; Available from: <https://www.aftenposten.no/okonomi/i/R9xk2/Hydro-gigant-i-Brasils-regnskog>
96. Et lite stykke regnskog. [Internet]. NRK; 2018 [cited 2024 Feb 15]. Available from: <https://tv.nrk.no/serie/brennpunkt/2018/MDDP11001118/avspiller>
97. Wenzel F. “A Amazônia já era!”: como a imprensa glorificou a destruição da floresta na ditadura militar [Internet]. (o)eco. 2020 [cited 2024 Feb 16]. Available from: <https://oeco.org.br/reportagens/a-amazonia-ja-era-como-a-imprensa-glorificou-a-destruicao-da-floresta-na-ditadura-militar/>
98. Alvarez-Moya C, Reynoso-Silva M. Assessment of genetic damage induced via glyphosate and three commercial formulations with adjuvants in human blood cells. Int J Mol Sci. 2023;24(5):4560. <https://doi.org/10.3390/ijms24054560> PMID: 36901992
99. Posthuma L, Brack W, van Gils J, Focks A, Müller C, de Zwart D, et al. Mixtures of chemicals are important drivers of impacts on ecological status in European surface waters. Environ Sci Eur [Internet]. 2019 Sep 30 [cited 2020 Mar 3];31(1):71. Available from: <https://doi.org/10.1186/s12302-019-0247-4>

100. European Commission, Directorate General for Health & Consumers. Toxicity and assessment of chemical mixtures. Brussels: European Commission; 2012.
101. Allen J. Stop playing whack-a-mole with hazardous chemicals. *Washington Post* [Internet]. 2016 Dec 15 [cited 2019 Dec 16]. Available from: https://www.washingtonpost.com/opinions/stop-playing-whack-a-mole-with-hazardous-chemicals/2016/12/15/9a357090-bb36-11e6-91ee-1addfe36cbe_story.html
102. Hendlin YH. Surveying the chemical anthropocene: chemical imaginaries and the politics of defining toxicity. *Environ Soc* [Internet]. 2021 Sep 1 [cited 2021 Sep 13];12(1):181–202. Available from: <https://www.berghahnjournals.com/view/journals/environment-and-society/12/1/ares120111.xml>
103. Lerner S. Sacrifice zones: the front lines of toxic chemical exposure in the United States. Cambridge, MA: MIT Press; 2010.
104. Grandjean P, Bellinger D, Bergman Å, Cordier S, Davey-Smith G, Eskenazi B, et al. The faroes statement: human health effects of developmental exposure to chemicals in our environment. *Basic Clin Pharmacol Toxicol*. 2008;102(2):73–5. <https://doi.org/10.1111/j.1742-7843.2007.00114.x> PMID: [18226057](https://pubmed.ncbi.nlm.nih.gov/18226057/)
105. Wiebe SM. Everyday exposure: indigenous mobilization and environmental justice in Canada's chemical valley. Vancouver, BC: University of British Columbia Press; 2017.
106. McEwen BS. Allostasis and allostatic load: implications for neuropsychopharmacology. *Neuropsychopharmacol* [Internet]. 2000 Feb [cited 2022 Mar 17];22(2):108–24. Available from: <https://www.nature.com/articles/1395453>
107. Szasz A. Shopping our way to safety: how we changed from protecting the environment to protecting ourselves. Minneapolis: University of Minnesota Press; 2007.
108. James-Todd TM, Chiu Y-H, Zota AR. Racial/ethnic disparities in environmental endocrine disrupting chemicals and women's reproductive health outcomes: epidemiological examples across the life course. *Curr Epidemiol Rep*. 2016 Jun;3(2):161–80. <https://doi.org/10.1007/s40471-016-0073-9> PMID: [28497013](https://pubmed.ncbi.nlm.nih.gov/28497013/)
109. Relyea RA. Predator cues and pesticides: a double dose of danger for amphibians. *Ecol Appl*. 2003 Dec 1;13(6):1515–21. Available from: <http://www.esajournals.org/doi/abs/10.1890/02-5298>
110. Relyea RA. The lethal impacts of Roundup and predatory stress on six species of North American tadpoles. *Arch Environ Contam Toxicol*. 2005;48(3):351–7. <https://doi.org/10.1007/s00244-004-0086-0> PMID: [15886853](https://pubmed.ncbi.nlm.nih.gov/15886853/)
111. Relyea RA. Amphibians are not ready for Roundup®. In: Elliott JE, Bishop CA, Morrissey CA, editors. *Wildlife ecotoxicology* [Internet]. New York, NY: Springer New York; 2011 [cited 2020 Mar 8]. p. 267–300. Available from: http://link.springer.com/10.1007/978-0-387-89432-4_9
112. Lins N, Staes B. Special Committee on the Union's authorisation procedure for pesticides. REPORT on the Union's authorisation procedure for pesticides [Internet]. Brussels: European Parliament; 2018 Dec [cited 2024 Feb 18]. Report No.: A8-0475/2018. Available from: https://www.europarl.europa.eu/doceo/document/A-8-2018-0475_EN.html
113. Portier CJ, Armstrong BK, Baguley BC, Baur X, Belyaev I, Bellé R, et al. Differences in the carcinogenic evaluation of glyphosate between the International Agency for Research on Cancer (IARC) and the European Food Safety Authority (EFSA). *J Epidemiol Community Health* [Internet]. 2016 Aug [cited 2019 May 1];70(8):741–5. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4975799/>
114. Chakraborty J, Maantay JA, Brender JD. Disproportionate proximity to environmental health hazards: methods, models, and measurement. *Am J Public Health*. 2011;101(Suppl 1):S27–36. <https://doi.org/10.2105/AJPH.2010.300109> PMID: [21836113](https://pubmed.ncbi.nlm.nih.gov/21836113/)
115. Eastmond D. Glyphosate hazard and risk assessment: a comparison of the approaches of two international agencies. 42nd Annual Summer Meeting of The Toxicology Forum; 2016 Jul; Salt Lake City, UT.
116. Benbrook C. Shining a light on glyphosate-based herbicide hazard, exposures and risk: role of non-hodgkin lymphoma litigation in the USA. *Eur J Risk Regul* [Internet]. 2020 Apr 3 [cited 2020 Jul 3];1–22. Available from: https://www.cambridge.org/core/product/identifier/S1867299X20000161/type/journal_article
117. Engelen W. L&G reputation management session summary [Internet]. UCSF: Industry Documents Library; 2014 Feb [cited 2024 Jan 21]. Available from: <https://www.industrydocuments.ucsf.edu/docs/#id=mmxw0229>
118. Farmer D, Koch M. Email from Heydens, William F to Koch, Michael S regarding IARC planning [Internet]. 2015 Feb [cited 2019 May 30]. (Chemical Industry Documents). Report No.: gxmn0226. Available from: <https://www.industrydocuments.ucsf.edu/chemical/docs/#id=gxmn0226>

119. Hendlin YH, Vora M, Elias J, Ling PM. Financial conflicts of interest and stance on tobacco harm reduction: a systematic review. *Am J Public Health*. 2019;109(7):e1–8. <https://doi.org/10.2105/AJPH.2019.305106> PMID: 31095414
120. Adekunle L, Chen R, Morrison L, Halley M, Eng V, Hendlin Y, et al. Association between financial links to indoor tanning industry and conclusions of published studies on indoor tanning: systematic review. *BMJ*. 2020;368:m7. <https://doi.org/10.1136/bmj.m7> PMID: 32019742
121. Burtcher-Schaden H. How can EU authorities say that glyphosate is not genotoxic? 2021 Nov. (GLOBAL 2000 (Friends of the Earth Austria)).
122. Riofrancos T, Kendall A, Dayemo KK, Haugen M, McDonald K, Hassan B, et al. Achieving zero emissions with more mobility and less mining [Internet]. Climate and Community Project; 2023 [cited 2024 Feb 23]. Available from: <http://www.climateandcommunity.org/more-mobility-less-mining>
123. Gayle D. Reliance on hi-tech solutions to climate crisis perpetuates racism, says UN official. *The Guardian* [Internet]. 2022 Dec 27 [cited 2024 Feb 23]. Available from: <https://www.theguardian.com/world/2022/dec/27/reliance-on-high-tech-solutions-to-climate-crisis-perpetuates-racism-says-un-official>
124. Greenfield P. Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows. *The Guardian* [Internet]. 2023 Jan 18 [cited 2024 Feb 23]. Available from: <https://www.theguardian.com/environment/2023/jan/18/revealed-forest-carbon-offsets-biggest-provider-worthless-verra-aoe>
125. Edwards G, Gellert PK, Faruque O, Hochstetler K, McElwee PD, Kaswhan P, et al. Climate obstruction in the Global South: future research trajectories. *Males J*, editor. *PLOS Clim* [Internet]. 2023 Jul 12 [cited 2024 Feb 23];2(7):e0000241. Available from: <https://dx.plos.org/10.1371/journal.pclm.0000241>
126. Jacquet J. *Is shame necessary? New uses for an old tool*. New York: Vintage Books; 2016.
127. Lyon T, Krill J, editors. *Rainforest Action Network*. In: *Good cop/bad cop: environmental NGOs and their strategies toward business*. Routledge; 2010.
128. Baron DP, Diermeider D. Strategic activism and nonmarket strategy [Internet]. Kellogg Insight. 2008 [cited 2024 Feb 24]. Available from: https://insight.kellogg.northwestern.edu/article/strategic_activism_and_nonmarket_strategy1
129. Luhmann N. *Ecological communication*. Cambridge, UK: Polity Press; 1989.
130. Allen DS. *Talking to strangers: anxieties of citizenship since Brown v. Board of Education*. Chicago: University of Chicago Press; 2004.
131. Celermajor D, Schlosberg D, Rickards L, Stewart-Harawira M, Thaler M, Tschakert P, et al. Multispecies justice: theories, challenges, and a research agenda for environmental politics. *Environ Politics* [Internet]. 2020 Oct 7 [cited 2020 Oct 8];1–22. Available from: <https://www.tandfonline.com/doi/full/10.1080/09644016.2020.1827608>
132. Sawin E. The magic of “multisolving”. *Stanf Soc Innov Rev* [Internet]. 2018 [cited 2022 Jul 13]; Available from: https://ssir.org/articles/entry/the_magic_of_multisolving
133. ExxonMobil. Mitigating emissions in our operations [Internet]. 2018 Oct [cited 2019 May 17]. Available from: <https://corporate.exxonmobil.com:443/en/Community-engagement/Sustainability-Report/Managing-risks-of-climate-change/Mitigating-emissions-in-our-operations>
134. ExxonMobil. Advanced biofuels and algae research [Internet]. ExxonMobil Climate Solutions. 2018 [cited 2022 Aug 15]. Available from: <https://corporate.exxonmobil.com:443/Climate-solutions/Advanced-biofuels/Advanced-biofuels-and-algae-research>
135. Crowley K, Bloomberg AN. Exxon booted from carbon tax alliance after lobbying scandal [Internet]. *Los Angeles Times*. 2021 [cited 2023 Jan 30]. Available from: <https://www.latimes.com/business/story/2021-08-06/exxon-booted-from-carbon-tax-alliance-after-lobbying-scandal>
136. Supran G, Oreskes N. Assessing ExxonMobil’s climate change communications (1977–2014). *Environ Res Lett* [Internet]. 2017 Aug [cited 2020 Aug 6];12(8):084019. Available from: <https://doi.org/10.1088%2F1748-9326%2Faa815f>