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## COMMENTARY

# Strength out of weakness: Rethinking scientific engagement with the ecological crisis as strategic action

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Faced with the ecological crisis, environmental scientists are asking what else besides providing evidence can they do to steer needed processes of substantive change. We argue that such an exploration should start by recognizing their weakness regarding the forces aiming at slowing down the pace of change. Recognizing this weakness should lead scientists to a change of tactics, embracing forms of strategic action used for centuries by groups on the weaker side of power struggles: that is, guerrilla strategies. Avoiding simplistic celebrations of guerrillas—historically a form of warfare that has produced as much pain as gain—an appraisal of some of its strategic tenets could help scientists to sketch alternative forms of engagement with the ecological crisis. Instead of grand gestures and direct confrontations, they could focus on carrying out *epistemic strategic actions*, or initiatives centered on the strategic usage of environmental knowledge and knowledge infrastructures to reduce, neutralize, and/or redress the impact of the organizations and regulations blocking, diverting, or slowing down decisive action regarding the ecological crisis. These actions could involve producing novel forms of knowledge, exposing facts that are currently hidden, refusing to engage in the production of contentious knowledge or, in extreme cases, disrupting specially damaging knowledge infrastructures. *Please refer to Supplementary Material for a full text Spanish version of this article.*

Ante la gravedad de la crisis ecológica, científicos de distintas áreas se están preguntando qué más podemos hacer -además de aportar evidencia- para motivar procesos sustantivos de transformación socioambiental. En este artículo, sostenemos que la exploración de formas alternativas de acción debería empezar por reconocer la posición de debilidad de los científicos frente a las fuerzas que buscan ralentizar o frenar los procesos de transformación. Reconocer esta debilidad debería llevarnos a un cambio de táctica, adoptando formas de acción estratégica utilizadas durante siglos por grupos en el lado más débil de las luchas de poder: las guerrillas. Evitando una celebración simplista de la guerrilla -históricamente una forma de conflicto armado que ha producido más dolor que logros- analizamos cómo algunos de sus principios estratégicos nos pueden servir para desde las ciencias esbozar formas alternativas de acción en relación con la crisis ecológica. En lugar de declaraciones públicas y enfrentamientos directos, los científicos deberíamos desarrollar novedosas *acciones epistémicas estratégicas*, es decir, iniciativas centradas en el uso estratégico del conocimiento ambiental y sus infraestructuras para reducir, neutralizar y/o corregir el impacto de organizaciones y normativas que bloquean, desvían o ralentizan las transformaciones urgentes en relación con la crisis ecológica. Estas acciones podrían implicar la producción de formas novedosas de conocimiento, la exposición de conocimiento actualmente oculto, la negativa a participar en la producción de conocimiento controversial o, en casos extremos, la disrupción de infraestructuras o procesos de conocimiento especialmente dañinos. *La versión en español de este artículo se puede encontrar en Material Suplementarias.*

**Keywords:** Ecological crisis, Forces of inaction, Weakness, Guerrilla strategies, Epistemic strategic actions

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## Introduction

“What else can we do?” This is the question—muttered with anxiety and uncertainty, with sorrow and anger—that is on the lips of a growing number of environmental scientists worldwide.<sup>1</sup> Almost every day they are bombarded with information about the worsening ecological crisis.<sup>2</sup> Record heat, droughts, floods, and wildlife depletion worldwide—among growing levels of emissions and pollution—show a world that is certainly “on fire,” as described by Greta Thunberg a few years back. In addition, there is the threat of several environmental tipping points likely to be imminently activated, causing disruptive weather patterns, ecosystems deterioration, and social unrest unseen in modern times.

To the dismay of many scientists, these developments have been foretold many times. For at least the last 3 decades, countless science-based publications, events, policy briefs, and public science advocacy initiatives have been arguing about the devastating consequences of our unsustainable ways of living and the need to make radical changes to avoid utter ecological collapse. These efforts have joined those carried out by environmental NGOs and the general citizenry, claiming the urgent need for a rapid and just transition toward sustainability. Nevertheless, “business-as-usual is still on, regardless of all the strikes, the science, the pleas, and the millions with colorful outfits and banners” (Malm, 2021, p. 25).

Given this lack of meaningful change, a growing number of scientists are currently asking what else they can do to help catalyze decisive collective action. Some are committing to ever more sophisticated forms of scientific advocacy, believing that providing more compelling information will finally persuade governments and industry into decisive action (Oreskes, 2020; Rosenblum, 2020; Gardner et al., 2021). Others have called for a boycott on the production of environmental knowledge until there is real policy advance (Glavovic et al., 2021). Yet others have proposed that environmental scientists should engage in direct activism (Green, 2020; Garber, 2021; Capstick et al., 2022), including civil disobedience (Gardner and Wordley, 2019), and in radical actions that aim to address the root causes of climate change (Morrison et al., 2022).

We wonder whether these initiatives are radical enough. Scientific advocacy and activism are nothing new; they have been practiced since the very beginning of modern science (Frickel and Arancibia, 2022). Movements such as the “Union of Concerned Scientists” (Downey, 1988), “Science for the People” (Schmalzer et al., 2018) or, in Latin America, “Ciencia Digna” (Feeney-McCandless,

2017) have sought to challenge governments, corporations and the general public into action. As others have pointed out, grand gestures (such as a boycott by scientists of the Intergovernmental Panel on Climate Change) tend to be quite naïve about the politics of knowledge in contemporary societies and would probably have no effect at all (Cologna and Oreskes, 2022; Turnhout and Lahsen, 2022).

Our country, Chile, presents a stark example of the difficulties and limitations of traditional forms of scientific advocacy. In the wake of massive nationwide civic riots in October 2019, a political accord was reached to change the country’s constitution, enacted during the Pinochet military dictatorship period (1973–1990) and the backbone of the neoliberal governance model in place since. Many environmental scientists and organizations in Chile saw this process as an opportunity to enshrine the fight against the ecological crisis at a constitutional level. They embarked on multiple initiatives to influence the process, from writing briefs to becoming elected members of the constitutional assembly. As a consequence, the proposed constitutional draft included many articles about environmental issues, becoming the first “ecological constitution” in the country’s history (Costa, 2021). However, despite vocal support for this draft by many scientific bodies, Chilean voters soundly rejected the new text in a referendum carried out in September 2022. Undoubtedly, this rejection had many causes. Yet it is worth noting the utter irrelevance of the ecological crisis in public debates prior to the referendum. Had years of advocacy by many environmental scientists and organizations come to nothing?

This bitter defeat has reaffirmed our belief that the gravity of the crisis calls for a more radical reshaping of the scientific endeavor worldwide and in particular the need for scientists to better connect with communities and organizations affected by the crisis. We think Chile’s experience suggests that radical changes are needed to reshape the ways in which scientists engage the ecological crisis. Such a change includes but should go beyond scientists assuming roles as political actors by becoming public intellectuals, lobbying legislators, or organizing climate change rallies. Additionally, we argue that given the current ecological crisis, scientists can best contribute to ongoing struggles for a cleaner, healthier planet through radical changes to what they do best: producing science. But such science cannot be produced as usual, at least not all the time (see for instance Nature Editorial, 2023). Complementing conventional scientific practices—still highly relevant, of course—novel modes of scientific knowledge production are needed, among them a mode that we are calling *epistemic strategic actions*. In what follows, we rethink some of the key tenets of the relationship between science and power in the context of the ecological crisis.

## Utter weakness

A key starting point in this process must be to fully acknowledge who and what environmental scientists are dealing with. The institutions and people supporting the status quo regarding the exploitation of nature—which we

1. By “environmental scientists” we mean actors with technical and/or scientific training in the environmental sciences broadly understood (from both the natural, health, and social sciences), including university-based scholars, engineers, and technicians in governments, NGOs, and the private sector.

2. Lacking a better term, we use “ecological crisis” to refer to the sum of all the troubles facing Earth’s ecosystem, including climate change, biodiversity depletion, and ubiquitous pollution.

will call, for lack of a better term, the *forces of inaction*—constitute probably the most powerful coalition in human history. It includes national governments as well as some of the largest corporations and wealthiest people the world has ever seen. Absent a common ideology or structure, they share a broad interest in stopping or slowing down initiatives aimed at enacting substantive and just transformation processes. The reasons for such opposition are manifold, mostly pointing toward the maintenance of a socioecological model of resource extraction and land use from which they have profited massively and through which they can wield tremendous power (Mitchell, 2013; Patel and Moore, 2017). Given the massive political, economic, and even symbolic stakes they have in ecological devastation, past, present, and future, their resistance to change with all the means possible is only to be expected. And the forces of inaction have many, many means.

Against such massive opposition, committed scientists should start by dismissing the fantasy that science could ever “speak truth to power” to the forces of inaction. Such a claim rests on the assumption that scientists face such power in a situation of relative equality, when nothing of the sort exists. Scientists’ authority in policy and public affairs has long been more fragile than mid-century governance models suggested. In this model, scientific authority depends on their credibility which in turn depends on appearing objective. Appearing objective and retaining public trust have become more difficult for scientists for various reasons. Scientists must reckon with betrayals of public trust, historic and ongoing. This includes cases where scientists ignored local knowledges, including of harms caused by new technologies like weapons or chemicals, and cases where scientists “self-censor” or manipulate data to avoid offending industry or military paymasters (Oreskes and Conway, 2011; Barandiaran, 2018). Trust in science is also eroded due to corporate sponsorship which raises questions of who scientists really work for. Recent experimental evidence from the United States suggests that engaging in scientific advocacy may not damage scientists’ credibility, depending on the issue at stake, the level of controversy and—crucially—the perceived motivations of scientists (Kotcher et al., 2017). While corporate sponsorship has grown, environmental advocacy among scientists has continued to be discouraged and even censured, presumably to maintain the appearance of objectivity (Delborne, 2016; Boykoff and Oonk, 2020).

This all puts scientists in a weak position even in those spaces where they could have an influence on government and corporate actors or the general public. Globally the media is not only controlled by corporate interests, but research shows that effective communication about the ecological crisis requires emotion and storytelling, not hard facts or data which scientists are trained to stick to in the name of objectivity (see e.g., Lidskog et al., 2020; Cherry et al., 2022). The United Nations Framework Convention on Climate Change conferences of parties offers scientists access to political and economic elites, thus curtailing opportunities to speak with those ready for more radical action (Bäckstrand and Kuypers, 2017; Linden,

2022). Within the UN climate process, corporate engagement with science-based initiatives has reinforced the status quo and helped marginalize any kind of radical proposals by scientists (Pulver, 2023). In short, corporate pressures and the weight of historic wrongs are straining to the breaking point the mid-century values that underpinned scientific authority.

Moreover, science has frequently been complicit with the forces of inaction. Complicity has been passive, for instance, when scientists fail to disclose or criticize the connections between the ecological crisis and political power. This happens when reductionist climate narratives frame the crisis exclusively in terms of massive “global” processes which diminish the responsibility of specific and often powerful actors at multiple scales for causing climate change (Hulme, 2011), when scientists reduce the gravity of certain problems to appease their funding bodies (Linden, 2022, p. 177), or when they remain silent in public about concerning results obtained while working for companies (Supran et al., 2023). Complicity has also been active. For example, in toxics regulation, scientific knowledge has been the very means through which environmental injustices have been enshrined, perfected, and defended (Langston, 2010; Oreskes and Conway, 2011; Boudia and Jas, 2014). Toxicologists working in industry and for regulatory agencies have manipulated what is publicly known about toxic chemical risks and impacts. As noted by Guldi (2021b, p. 4) “science was neither innocent nor uninvolved in these machinations; science was the medium by which [violent] political innovations were executed.”

Any effective rethinking of scientific practices to address the ecological crisis must start by *recognizing the utter weakness of the position committed scientists occupy*. In contrast with the prestige they usually enjoy in their working and private lives, they are largely irrelevant to the actors in power, unless they comply with their aim of stopping/slowing down substantive change. Scientists have not only progressively lost their centrality in environmental debates (Schäfer and Painter, 2021) but they also face growing opposition from actors and organizations, often business-related, with better resources and knowledge to influence policy toward inaction (Vesa et al., 2020; Brulle, 2021). In most cases “speaking truth to power” becomes a “missed resistance” which is largely ignored by its object (Hollander and Einwohner, 2004, p. 546).

Recognizing their weakness, however, should not be a cause of pessimism or nihilism regarding the political capacities of committed scientists. On the contrary, it could become the starting point for truly transformative environmental action.

All over the world, especially in the Global South, there are examples of movements who, starting from a position of utter weakness, managed in time to effectively overturn powerful opposition and accomplish their goals. Using multiple “weapons of the weak” (Scott, 1985), they managed to resist repression, change the terms of the discussion and, at last, achieve a great deal of their original agenda. From the British suffragettes to Latin America’s Indigenous rights campaigns, many examples show us

that struggles may be won even from a position of utter weakness. Recognizing a position of weakness, however, calls for a strategy of weakness. No longer should engaged scientists participate solely with public letters or in open debates—as is implicit in the “speaking truth to power” motto. Instead, movements of the weak avoid the open field or the limelight and opt for covert operations. They ditch grandiloquence and self-importance for stoicism and stubbornness. They ditch conventional advocacy for guerrilla strategies.

### Guerrilla as strategy

The term guerrilla has become fashionable nowadays. From “guerrilla marketing” (Levinson and Godin, 1994) to “guerrilla diplomacy” (Brigham, 2019), it is widely applied to multiple forms of action that use irregular or novel means to reach their aims. In some of these uses the term even acquires a somewhat playful tone, the perfect antidote to dour conventional approaches. As Latin American scholars, we cannot take the term so lightly.

The term guerrilla (literally “little war”) originally referred to a kind of warfare in “which the strategically weaker side assumes the tactical offensive in selected forms, times, and places” (Huntington, 1962, p. xvi). Guerrilla warfare has been practiced all over the world since ancient times, acquiring a special prominence in Latin America during the twentieth century, becoming “the guerrilla continent par excellence” (Laqueur, 2017, p. 52). In contrast to the success of the Cuban Revolution, most guerrillas did not achieve their aims. As clear in the lonely death of Che Guevara in Bolivia, most efforts culminated “in the systematic elimination of the guerrilla and the extinction—i.e. the physical disappearance or exile—of the . . . movements that had developed around them” (Kruijt et al., 2019, p. 209). Enthralled by guerrilla warfare, thousands of people all over the continent—especially young students—lost their lives or were subjected to torture and exile, while countless civilians suffered indiscriminate acts of violence. As a particular kind of armed struggle, guerrillas left a painful legacy across the continent that resonates today.

That said, and leaving armed struggle aside, guerrilla strategies also refer to a form of strategic action in which the weaker side takes the initiative, aiming to optimize scarce resources. The central principle of guerrilla strategy is to avoid open confrontation. Large-scale, highly visible confrontations are especially well suited for those with more funding, equipment, and personnel. Guerrillas, in the experienced words of Lawrence (2008, p. 249), favor instead the “tip and run, not pushes, but strokes . . . [to use] the smallest force in the quickest time at the farthest place.” Only through this approach will they be able to turn, as synthesized by Guevara (1964, p. 11), “their relative weakness . . . [into] their strategic strength.” A second principle is to partner with new parties, especially the general public. As recognized by Laqueur (2017, p. 401) “no guerrilla movement can possibly survive and expand against an overwhelmingly hostile population.” Only by becoming part of larger struggles, involving different

collectives and multiple locations, can guerrillas maximize the odds of achieving its stated aims.

The possibilities that guerrilla strategies offer for political action in situations of weakness have been recognized by different actors in the environmental movement. Starting from Earth First! in the United States in the 1970s (Woodhouse, 2018), a plethora of “radical environmentalist” movements have emerged throughout the world in the last decades. Many of them have adopted guerrilla strategies over conventional tactics such as lobbying or public demonstrations. Extinction Rebellion, Ende Gelände, and others have opted to use “tactics to obstruct and prevent state-sanctioned activities that they perceive as environmentally harmful” (Cianchi, 2015, p. 16). While some of these actions, such as human barricades, are classic acts of civil disobedience, others took more radical forms, openly breaking the law. Chief among them is ecological sabotage, or ecotage (Vanderheiden, 2008, p. 301), usually focused on destroying pieces of infrastructure (such as labs, diggers, or trucks) that are perceived as being directly involved in causing environmental damage. Although violent in material terms (a topic that we address below) these actions are “subject to strong moral codes based on avoiding physical harm to people or animals” (Plows et al., 2004, p. 200).<sup>3</sup> Based on singular well-planned attacks and rapid retreats, radical environmentalist action is a mode of operation in line with a guerrilla strategy. Yet secrecy is not complete, as most actions aim to enter public discussion, especially through media coverage, seemingly the “strongest weapon in the fight for the Earth” (Scarce, 2016, p. 6).

While recognizing the suffering caused by guerrilla warfare, we argue that certain components of guerrilla strategies have the potential to link radical transformational aims with successful strategic action. A guerrilla-inspired environmental scientist moves from an awareness of positionality to enable on-the-ground alliances and interdependencies through what we are calling Epistemic Strategic Actions (ESAs)—explored next. Because we see the ecological crisis as the most consequential struggle of the twenty-first century, and in light of the massive disparity in the forces involved, we believe some notions from guerrilla strategies could offer interesting paths for scientists to engage with the struggles against the forces of inaction.

### Epistemic strategic actions

By using the term *action*, we wish to connect ESAs with the long tradition of direct action initiatives carried out by multiple environmental groups since the very origins of the movement (Heynen and Van Sant, 2015). Like those actions, ESAs focus on activities that are markedly different “to those of the liberal democratic system” (Anderson, 2004, p. 106), especially conventional forms of expert

3. As analyzed by Loadenthal (2017, p. 4.) “Throughout more than 27,100 recorded attack incidents over a 38-year period, 98% of attacks target property (i.e., not human beings), and 99.7% cause no injury.”



advocacy in which scientists define the problem and recommended solutions. Instead, ESAs would include acts of civil disobedience that mobilize publics in specific contexts as well as bolder moves that search for novel means to “demonstrate a truth which has been otherwise impossible to demonstrate in public by other means” (Barry, 1999, p. 77) and to engage in efforts to physically “[obstruct] or [deter] contentious practices” (Smith, 2018, p. 13). We envision ESAs as diverse, grounded, and speculative, consciously exploring novel ways to engage in the struggle for socioenvironmental justice in a world in crisis.

In line with guerrilla tactics, the *strategic* component of ESAs refers to the challenge of avoiding open confrontation while collaborating with multiple publics, collectives, and organizations to carry out meaningful actions and interventions. Collaboration should begin from the recognition of the privileges scientists, particularly some sub-populations, do enjoy and can put to good use in the service of ESAs. Examples abound of climate scientists putting their privilege to use in appeals to legislatures, the general public, international fora, and even lawsuits. Yet this moment calls for renewed commitments that are grounded in the search for socioenvironmental justice and the recognition that for over 30 years elite strategies have failed. This commitment should not be abstract or policy oriented, something to address at the end of a long process, but part of a daily practice that is intentional, hopeful, and forceful.

Historically guerilla actions have been forcefully repressed, in the Global North (see e.g., the experiences of the Black Liberation Army or the Puerto Rican Independientistas) and in the Global South, as discussed above. The risk of repression while implementing ESAs should be carefully evaluated for each specific time and place, and any action that might be considered as violent should be evaluated using a multilevel “ethic of responsibility” (Smith, 2018).<sup>4</sup> Although violence against infrastructure has been a regular tactic of environmental direct actions groups since the 1970s, such actions can be negatively perceived by the general public and repressed by the actors in power (Gunderson and Charles, 2023). Another difficulty is that “working within the system” does not necessarily guarantee one’s safety. In short, the risk of repression needs to be seriously considered for each time, place, and action—particularly by those who have never considered it before or who think of themselves as protected, to better understand the power and motivations of the forces of inaction.

Successful and open collaboration for change while avoiding unwanted attention could be achieved by

eschewing high-visibility events preferred by mainstream activism in favor of organizing at smaller scales in a more distributed fashion. These efforts should focus on those spaces often overlooked by the forces of inaction: the countryside, the Global South, the shanty town, the ruin, the local community, to name a few. On the outskirts of global power, these spaces have 2 characteristics that could heighten their impact. They concentrate most of the damage and violence resulting from the ecological crisis, and too often scientists have approached these places merely as sites of epistemic extraction (Vetter, 2016). That said, contexts vary enormously and ESAs need to reflect local specificities; a closed list of actions that can be universally applied across such different places is not possible. Rather, by intentionally looking at these overlooked places, guerrilla-inspired science should commit to reciprocal knowledge building (that both works with local knowledge and contributes to building it) and to supporting place-based struggles that aim to build resilience.

Finally, the *epistemic* component refers to taking advantage of scientific expertise by focusing on the production, use, and storage of environmental knowledge. Even if the forces of inaction don’t want to hear what science is saying, they use scientific knowledge to carry out many tasks, from planning new infrastructures to monitoring impacts. Scientific knowledge may be required (as in environmental impact assessments) or be used to legitimate a political or economic decision (or both). Again, the contexts vary widely, and ESAs need to be adapted; but in all cases, the guerilla-inspired scientist would search for opportunities to demonstrate new truths and “obstruct or deter contentious practices” through blocking the production of some kinds of knowledge and forcefully calling out blind spots and weaknesses in knowledge.

In summary, ESAs could be defined as initiatives centered on the strategic usage of environmental knowledge and knowledge infrastructures to reduce, neutralize, and/or redress the impact of the organizations and regulations that are blocking, diverting, or slowing down decisive action regarding the ecological crisis. ESAs build on many existing practices and scientific communities, including citizen or community science, careful knowing, civic technoscience, and more. Many of these could be, and perhaps already are, ESAs oriented at disruption, avoiding open confrontation, and adopting a daily intentional practice of foregrounding socioenvironmental justice, in overlooked places, and against the power imbalances that put scientists in weak positions. This provocation seeks to support such ongoing efforts, including debates around what it means to “do science” with a community (Auerbach et al., 2019; Evans et al., 2023). More than singular or decisive events (“battles”), ESAs should be seen as a continual stream of partial and speculative interventions aimed at mending our world on fire.

ESAs can take 4 forms—production, exposure, refusal, and disruption—detailed next.

*Production ESAs* refer to initiatives centered on the production of new forms of knowledge. Instead of

4. Such ethic states that a certain degree of violence (against things, never toward humans) should be considered solely on cases in which there is “an attempt to prevent serious and urgent harm, if less radical measures to redress the harm have already been attempted or could demonstrably be expected to fail, and if an authoritative decision-making process has either been distorted in some way or has issued resolutions that are flouted” (Smith, 2018, p. 24).

merely producing sound scientific data, these initiatives would focus on producing “usable” (Lindblom and Cohen, 1979) or “meaningful” information (Shepherd and Lloyd, 2021) to challenge the functioning of the forces of inaction. Large-scale data are generally too broad to be meaningful to anyone beyond scientists and some policymakers, therefore ESA knowledge production aims to serve the needs of those impacted by the ecological crisis (Coen, 2021, p. 50). Such knowledge should be coproduced with the very collectives being affected by the crisis (Guldi, 2021b), building on citizen or community science efforts like the Louisiana bucket brigades (Overdeest and Mayer, 2007) or those documenting the negative impacts of fracking (Wylie, 2018). Special efforts must be made to reach disadvantaged communities of the Global South and Global North where gaps in scientific knowledge relevant to local contexts are common, ideally through a diversified scientific community that—inspired by guerrilla movements of oppressed peoples, particularly indigenous peoples—confronts the ongoing effects of racism and historic structural inequalities. Holding intersectional identities will help scientists build better alliances to produce guerrilla-inspired knowledge.

*Exposure ESAs* refer to initiatives focused on making public knowledge that is not easily available, understandable, and/or has been actively suppressed. In doing so, committed scientists could use official data and infrastructures to demonstrate the noxious effects of particular projects on local peoples or ecologies, and thus question dominant narratives and deceptive public relations schemes. This could involve creating public archives of data under the risk of deletion (Vera et al., 2018), auditing environmental commitments by governments and companies (Guldi, 2021a), or revealing the deception practices of powerful companies (Supran et al., 2023). The aim is not only to make this information public but also easily understandable, so different nonexpert collectives can engage with it. A telling example is the work of the late Argentinian molecular biologist Andrés Carrasco, who risked his career and safety by providing public access to data on the nefarious effects of glyphosate—a widely used commercial herbicide—on child development (Feeney-McCandless, 2017). In another poignant example, scientists in Taiwan collaborated with affected communities on a successful lawsuit against an U.S. transnational corporation for toxic damages (Jobin, 2021). These examples would be far more common, and hopefully also less tragic, if more scientists were inspired by guerrilla strategies.

*Refusal ESAs* are focused on avoiding the production of certain kinds of scientific knowledge and/or scientific collaborations. This is a resistance strategy long used by indigenous communities (Skewes and Guerra, 2004; Tuck and Yang, 2013) and involves putting pressure on organizations (including

universities) to prevent or discourage their participation in the production of potentially harmful environmental knowledge for ethical reasons. This could forestall or leave forever “undone” the science needed to move destructive projects forward (Frickel et al., 2010), while opening up spaces for the production of novel kinds of knowledge (indigenous, female, nonwhite, popular, etc.). Refusal could also involve engaging in campaigns to force scientific institutions to reject altogether funding from or collaborations with the forces of inaction (Harvey, 2022). An obvious first step is for scientists in the United States, Canada, and Europe—where many gas and oil companies are headquartered—to support the Fossil Free Research Initiative calling for universities to refuse all research funding from fossil fuel companies as well as divestment movements (Caers, 2023).<sup>5</sup>

Finally, and more controversially, *disruption ESAs* could focus directly on slowing down and/or damaging the epistemic infrastructures that support the forces of inaction. Through interventions such as overwhelming data collection practices, disconnecting cables, or refusing to publish (and thus reward) research that advances planetary destruction, committed scientists could disrupt the knowledge-based processes necessary for the development of novel forms of environmental damage. Following an ethic of responsibility (Smith, 2018), and taking extreme measures to avoid causing injury, we support disruption (like putting obstacles, blocking maintenance) over sabotage which is likely to have unexpected consequences. Epistemic disruption could be carried out in cooperation with organizations that are already undermining the infrastructures that cause ecological damage. Another kind of inspiring disruptive action was carried out by activist and university student Tim DeChristopher, who successfully bid for exploitation rights on millions of acres of public lands in Utah (United States) without having the money to pay for them. His actions collapsed the federal bidding process and resulted in the lands being protected (Dietz, 2013).

We do not take lightly the adoption of ESAs as a model of environmental action by committed scientists, and recognize the risks involved in claiming that a guerrilla strategy might be useful to produce novel forms of scientific engagement with the ecological crisis. Such risks derive from at least 3 complex issues.

First is the issue of a backlash. Besides the always present risk that some ESAs might end up unintentionally damaging innocent entities, there is the high possibility of a violent reprisal on the affected actors and organizations. Some people involved in these actions could end up

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5. Fossil Free Research initiative: <https://fossilfreeresearch.org/>; On divestment, see Fossil Free UC (<https://fossilfreeuc.net/>); and Fossil Free (<https://gofossilfree.org/>)

being criminally prosecuted—for instance, DeChristopher spent 21 months in jail for his action—or seeing their careers disrupted. Especially in the Global South, these kinds of actions could generate a violent, repressive response by the police or the military (Dunlap and Brock, 2022), even leading to deaths (Global Witness, 2022). Radical approaches could always engender violent outcomes, and those involved should reflect on and be aware of such risk.

Second, there is the issue of purism. Radical environmentalism has long been critiqued for being exclusionary and elitist. With roots in white, middle-class, highly educated constituencies, these movements historically manifested an indifference toward structural inequality and injustices, and dismissed as secondary struggles against racism or patriarchy (Pellow, 2014; Woodhouse, 2018). They similarly tended to adopt environmental science at face value, taking it as the ultimate and sole source of authority (Bowman, 2010). Any departure from “hard” data could be dismissed as irrelevant or secondary. This attitude has greatly diminished the appeal and support that such initiatives might have had among the general population, especially among the very groups whose environmental concerns they claimed to speak for. ESAs could repeat such costly mistakes unless scientists act with tact and humility, always working in collaboration with local communities/grassroots organizations and their ways of making sense of the world.

Third, ESAs should not be worked into an oppositional confrontation between climate “heroes” and “villains” nor is our goal to catalogue actions that “count” or “don’t count.” Rather, these ideas are presented to inspire actions that accelerate an ongoing process composed of many practices, worldwide, by scientists already working with communities and already fighting for a livable planet. In his classic book on the nature of scientific knowledge, Thomas Kuhn (1962) wrote that paradigm shifts—like that required by the ecological crisis—inevitably challenge the status of those in power and thus will be resisted. Confronting such resistances is as important as exploring novel forms of collaboration and regeneration, for example, by thinking about knowledge production as part of strategy seeking to build power against the forces of inaction.

## Conclusions

Too often in our history, calls for guerrilla actions have been made irresponsibly, sending young people into a life of armed struggle, unwinnable conflict, and violent death. As scholars from and in Latin America, we know this history well and do not feel seduced by the term. We know guerrillas are vulnerable and corporeal; they suffer and also inflict harm. As a consequence, we reluctantly invoke the term to imagine a new kind of political action among scientists, losing its warfare component but building on the key strategic insight of those who advocated for guerrilla responses to power. In response to the anguished question by many scientists about “what else can we do?” we challenge the scientific community to reimagine themselves as vulnerable political subjects seeking radical

socioenvironmental transformations in the face of massive opposition. Any hope of success requires building grassroots alliances, confronting ethical dilemmas, and acting strategically.

There is nothing automatically gratifying about engaging in ESAs. In most cases, guerrilla strategies are borne out of weakness and despair. If any other strategy were available, certainly most of its practitioners would avoid it. But increasingly there is really no alternative strategy. As the saying says, desperate times call for desperate measures. And our times are certainly desperate.

## Supplemental files

The supplemental files for this article can be found as follows:

Full text Spanish version.DOCX

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