

Counteradaptation in Vulnerable Socio-ecological Systems in Sierra Leone

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The study was approved by the Sierra Leone Ethics and Scientific Review Committee and the Harvard Institutional Review Board (IRB23-0843). Verbal consent was obtained from research participants as per the approved protocol.

Data availability statement

The data that support the findings of this study may be available on request from the corresponding author, ETR, but will require approval from the requestor's IRB and the Sierra Leone Ethics and Scientific Review Committee. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

Abstract

Sierra Leone is among the countries most vulnerable to climate change yet least resourced to confront its impacts. Mainstream climate governance often casts adaptation as a technical adjustment to biophysical hazards, but such framings risk naturalizing inequality by obscuring the longue-durée histories of extraction and dispossession that have structured vulnerability. Drawing on multi-sited ethnographic research in coastal, agrarian, and urban communities in Sierra Leone, this paper introduces the concept of *counteradaptation* to illustrate how people navigate not only environmental volatility but also the antagonistic pressures generated by (neo)colonial systems. Counteradaptation highlights how adaptive moves in one domain—whether foreign extraction, ‘development’ apparatuses, or climate policy regimes—create new pressures that compel situated responses elsewhere. Case studies of fishing communities, timber and gold frontiers, and informal urban settlements show how counteradaptation reframes habitability as a contested threshold and exposes the limits of technocratic adaptation toolkits. By situating climate response within histories of coloniality and predatory accumulation, counteradaptation offers a novel analytic for understanding ‘environmental’ behavior.

Keywords

climate change; adaptation; coloniality; counteradaptation; anthropology; STS; Sierra Leone

Main Text

Introduction

Sierra Leone is one of the countries most vulnerable to climate change, but is among those least equipped—economically, infrastructurally, and institutionally—to cope with its effects (Ahonsi 2022). Across its tidal wetlands, forest-agricultural uplands, and urban-coastal hillsides, residents confront rising seas, unpredictable rainfall, and intensifying landslides. Through ethnographic engagement in these ecological niches, our research asks: 1) To what, and to whom are Sierra Leoneans adapting? and 2) What do their strategies reveal about the political and epistemic terrain on which ‘adaptation’ itself is contested? We approach this by exploring how *coloniality* changes the ways climatic factors exert influence, with attention to how environmental-science *story technologies* supplant rights-based ones. (Coloniality has been described as the “matrix of power relations that persistently manifests transnationally and intersubjectively despite a former colony’s achievement of nationhood” (Richardson 2020, 3). Story technologies refer to the various disciplinary methods or approaches that render complex phenomena as curated narratives (Frankfurter et al. 2024).)

In expert climate discourse, the crises confronting people in Sierra Leone are typically framed as biophysical shocks that can be managed through technical adaptation. However, by foregrounding environmental volatility, this register risks obscuring the longue-durée histories of extraction that have routed human beings, gold, and diamonds out of the country, leaving impoverished socio-ecological systems in their wake (Frankfurter et al. 2019; Shaw 2020; Farmer 2020; Richardson, Barrie, et al. 2016; Abdullah and Rashid 2017; Hirsch 2024). In other

words, the environmental aid nexus at times recodes purposeful underdevelopment as climate-change vulnerability, and in so doing unwittingly naturalizes transnational relations of inequality.

To better analyze the co-constitution of historical dispossession and climate vulnerability, we introduce the concept of *counteradaptation*—a term that centers how actors adapt not only to environmental forces but also to the antagonistic pressures generated by other human systems (Richardson, Morrow, et al. 2016). We use this concept to analyze how Sierra Leoneans navigate ecological volatility, extractive legacies, and competing visions of collective wellbeing.

Genealogy and Theoretical Framework: Counteradaptation

Over the past two decades, the concept of adaptation has become central to climate governance (Adger et al. 2009; Bassett and Fogelman 2013). The term adaptation was first used to describe traits that enhance survival under particular environmental conditions (Darwin 1859). Lewontin later refined it to denote the evolutionary process by which organisms become better suited to their environments (1978). More recently, Jones and colleagues generalized the term as “a solution to persistent problems presented by the environment, broadly construed” (Jones et al. 2021).

As an extended metaphor, adaptation now circulates widely in policy, development, and academic discourse as the “process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities” (IPCC 2022). Over time, this framing has been critiqued for obfuscating how vulnerability to climate change is “shaped by political

economic processes and the social relations of production in which constraint rather than choice limits adaptive capabilities” (Bassett and Fogelman 2013). Further critiques include that adaptation frameworks 1) are increasingly co-opted by the logics of technocratic climate governance; 2) are often imposed on the Global South without addressing structural causes; and 3) focus mainly on incremental adjustments as opposed to transformative change. A 2013 content analysis of the climate change literature by Bassett and Fogelman found a dominance (70% of articles) of “adjustment adaptation” approaches (which view climate impacts as the main source of vulnerability); a much smaller percentage (3%) of articles focused on the social roots of vulnerability and the necessity for political–economic change to achieve “transformative adaptation.” The authors went on to note that the problem with a “proximate factors approach [to climate vulnerability] is that it lacks theoretical coherence. There is no analysis of the causal structures and social processes that make some populations more or less vulnerable” (Bassett and Fogelman 2013).

To address the shortcomings of this notion of adaptation, we reanimate another concept from evolutionary biology—*counteradaptation*. This term originally specified traits that evolve in response to an adaptation in other species, restoring or enhancing the counteradapting organism’s fitness—in other words, evolution via reciprocal adaptation and antagonistic co-evolution (Ehrlich and Raven 1964; Agrawal and Zhang 2021). Van Valen’s seminal 1973 “Red Queen Hypothesis” (Figure 1) formalized the idea that species must continually adapt merely to maintain relative fitness, because the environment—including biotic competitors, predators, and parasites—is always deteriorating from the organism’s perspective. Dawkins and Krebs later extended the metaphor to include ‘arms races,’ capturing the reciprocal escalation of adaptations

between antagonistic parties. Examples include host-parasite interactions (phages evolve proteins to attach to bacterial cell receptors and inject DNA → CRISPR–Cas systems recognize and cut phage DNA → phages evolve anti-CRISPR proteins or mutations in their DNA to evade bacterial defenses) (Barrangou et al. 2007; Hampton et al. 2020); toxic newts and garter snakes (newts produce tetrodotoxin (TTX) → snakes evolve TTX resistance → newts increase toxicity) (Brodie and Brodie 1991); and primate sexual behavior (male mate-guarding, sexual coercion, and infanticide → female counterstrategies including paternity confusion, cryptic choice, and coalitions/protective alliances) (Wrangham 1979; Smuts and Smuts 1993). Adaptation in this light is inherently *relational* (fitness depends on another's strategy), *escalatory* (change in one drives counterchange in the other), and *non-teleological* (there is no endpoint, only an ongoing struggle for advantage) (Levins 1985; Smith and Price 1973).

As was done with the term adaptation, we propose to similarly migrate this concept from evolutionary biology to environmental social science and climate policy. By coupling notions of antagonistic co-evolution with an attention to power relations (as exemplified by newt-garter snake and primate sexual conflict, respectively), counteradaptation foregrounds how people adjust simultaneously to environmental volatility *and* to the strategic advantages amassed by colonizers, corporations, and countries of the Global North through centuries of extraction, carbon overshoot, and predatory accumulation (Forsyth 2008; Blaikie and Brookfield 2015; Robbins 2012). The term directs analytic focus to the social and historical conditions that make particular adjustments necessary, clarifying the stakes and limits of climate governance premised on solely ecological renderings and interventions. Phenomenologically, counteradaptation centers the simultaneous processes of *sense-making* and *world-making* amidst conditions of

vulnerability structured by historical, political-economic, and climatic forces alike (Getachew 2019; Goodman 2013).

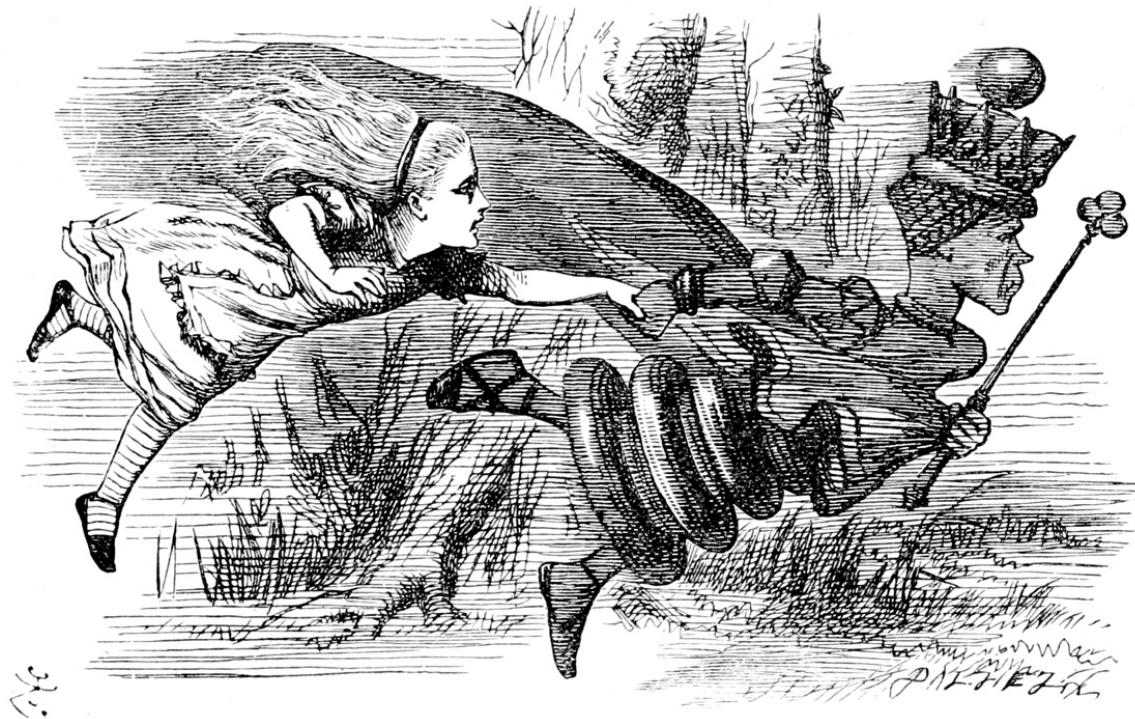


Figure 1. "Now, here, you see, it takes all the running you can do, to keep in the same place." -Lewis Carroll. 1871. Through the Looking-Glass, and What Alice Found There. Macmillan, London.

Transposed to the sociopolitical terrain of environmental behavior, counteradaptation invites us to reframe a central question that animates the social science of climate change: to what *or whom* are people adapting? While mainstream adaptation discourse is predicated on the notion that communities are adjusting to biophysical processes like rising seas, intensification of extreme weather events, or rising temperatures, this framing obscures the fact that 1) these ecological pressures are themselves conditioned by human systems; and 2) much of the vulnerability to these pressures is an artefact of (neo)colonial depredation (Figure 2) (Meché 2022; Andrews

2022). In other words, in addition to climate change, people and communities in the Global South are adapting to the ongoing actions of others (e.g., former colonizers, structural adjusters, corporate actors) whose own economic strategies have placed them at a structural advantage. Counteradaptation is thus a theoretical scaffold for understanding the recursive, unequal, and often conflictual terrain of ‘climate’ response. It is not only the environment that communities must navigate, but the human systems that continually reconfigure the contours of their ecological niches.

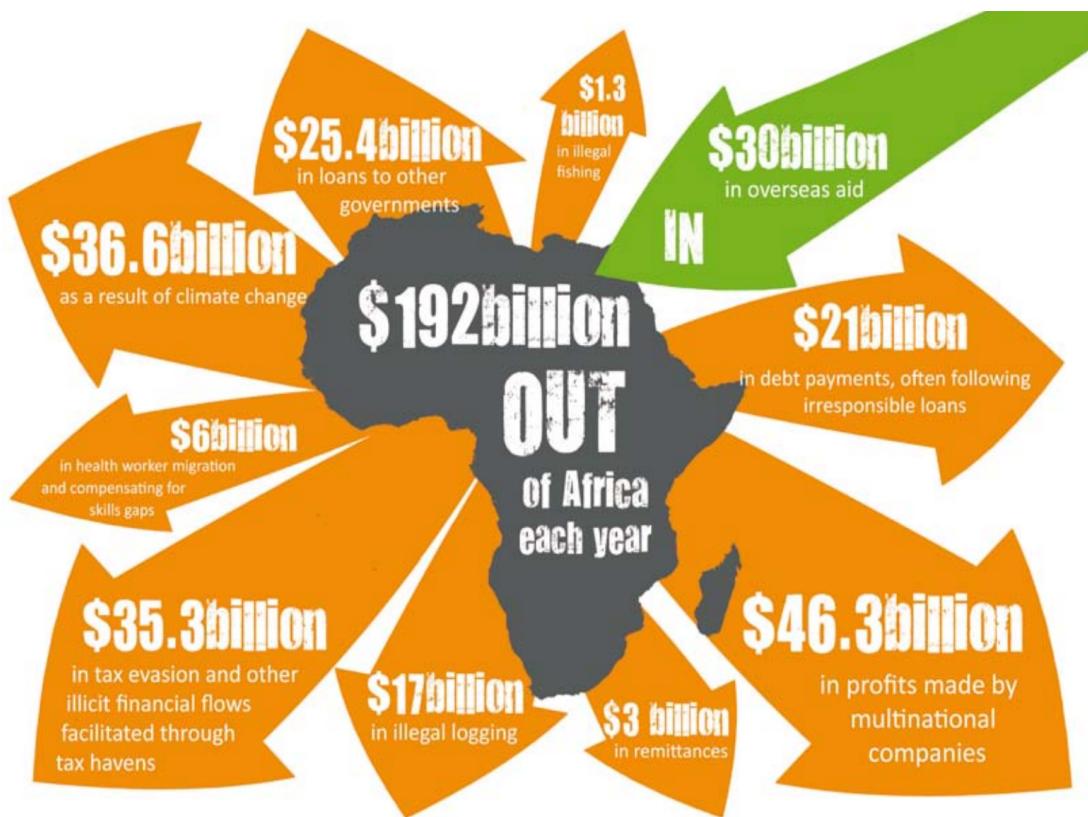


Figure 2. Neocolonialism: Illicit financial flows from the Africa continent (Health Poverty Action 2014).

Political ecologists have long reminded us that the language of ‘adaptation’ is anything but neutral. Arturo Escobar’s critique of development discourse exposes how technical keywords—*scarcity, capacity-building, risk management*—repackage colonial histories of extraction as problems to be solved by expert intervention. Jesse Ribot’s work in the Sahel builds on this to demonstrate how vulnerability is actively manufactured in the present: policies that promise local empowerment often re-centralize authority, delimit access to resources, and thereby deepen the very exposures they claim to relieve (Ribot 2014; 2011). Read together, these arguments unsettle the premise that adaptation is a value-free response to biophysical threats and instead reveal it as a political project, patterned by the same circuits of power-knowledge, capital, and governance that organize the global economy (Foucault 1995). Our notion of counteradaptation extends the critique by naming the antagonistic relation between those compelled to improvise daily survival in impoverished settings and the actors who, while marketing ‘adaptation’ as remedy, also reproduce the coloniality that makes such remedies necessary.

Counteradaptation also places Michel Foucault’s analytics of counter-conduct—the practices and forms of resistance through which individuals or groups refuse, subvert, or renegotiate the ways they are governed—in conversation with Edward Said’s critique of development and modernization rhetoric (Foucault et al. 2009; Said 1979). Said demonstrates how claims to expertise position colonized peoples as deficient and in need of tutelage, embedding geopolitical domination within ostensibly benevolent projects of improvement. Contemporary climate governance performs a similar move: coastal fishers, hillside farmers, and informal-settlement dwellers are interpellated as “vulnerable populations,” their agency corralled within externally calibrated metrics that flatten both power relations and the reductionism of climate discourse.

Counteradaptation extends these critiques by naming the discursive and material practices through which communities resist such framings—refusing, rerouting, or repurposing the “foreign gaze” (Abimbola 2019)—and, in so doing, unsettling the presumption that managed inequality is natural or inevitable (Richardson 2020; Farmer 2010).

Methods

Although Sierra Leone has a rich ethnographic archive on human–environment relations (Fairhead and Leach 1996; Richards 1996; Nyerges 2001), there is still little mainstream recognition of how communities understand and navigate their vulnerabilities, including those linked to climate change. To address this, our analysis draws on multi-sited and multi-actor ethnographic research (Fischer 2018; Little and Reinhardt 2007) carried out in Sierra Leone in the wake of the Ebola and COVID-19 outbreaks (Richardson et al. 2017; Kelly et al. 2018; 2022; Barrie et al. 2021; Hazel et al. 2022). We conducted semi-structured ethnographic interviews and participant-observation with respondents whose livelihoods surround key agricultural and extractive activities within three socio-ecological niches in Sierra Leone: coastal fishing communities in the Sherbro River; forest-agricultural communities in eastern Kono district adjacent to major gold and diamond mining areas; and informal coastal settlements in the capital Freetown.

Interviews were conducted in Krio, and field notes were collated daily. Members of the research team discussed findings and interpretations until consensus was reached on the dominant themes. Ethnographic data were then integrated with our theory of counteradaptation (outlined in the

Introduction) for an analysis of vulnerable socio-ecological systems in Sierra Leone. Quotes in the Results were translated from Krio into standard English.

The study was approved by the Sierra Leone Ethics and Scientific Review Committee and the Harvard Institutional Review Board (IRB23-0843). Verbal consent was obtained from research participants as per the approved protocol.

Results and Discussion

Case Study 1:

Konehun village (the names of all villages and interlocutors have been changed to preserve anonymity), deep in the rainy season, is saturated with water. The towering palm and banana trees do little to seep up the puddles that pockmark the sand between clusters of huts. A fishing community on the Sherbro estuary, Konehun's economic and social life has been inexorably tied to the estuarine waters since people can remember. But there seems to be less delineation now, as a "watery topography" (Diggins 2018) extends to the land on which people live. Water—from the estuary and from rains, and at times, bubbling up from the sand itself—drenches the insides of huts, ruins houses, stagnates, and allows mosquitoes to multiply. The village Chief told us that the extent of the deluge is a recent phenomenon. Before, "the town was much farther from the edge of the water. But now the water is penetrating too much." The water table, he explained, seems to be rising each year, so that the sand seems less able to absorb the rains and waves; or, possibly, the island is sinking. When it rains, the sand washes into the sea, and waves during the storms crash farther ashore, compounding the problem. "This is an area with no rocks under the village, only sand," the Chief explained. "This is why the town is moving, gradually, down."

Sierra Leone's southern coast's position as a nexus for extractive activities over the past six centuries—ranging from the capture of humans for chattel slavery to contemporary illicit fishing by foreign fleets (Rodney 1981; Akyeampong 2006; Amin 1974)—make it difficult for the Chief to disentangle the causes of what he witnesses today. In our conversations, we were told of rutile (titanium dioxide, a mineral used for industrial metal production and pigments) mining across the river displacing massive amounts of sand, clouding the delta and, it would seem, shifting geographies at a scale that could certainly cause topological changes. In more built-up villages nearby, like York Island and Bonthe, colonial infrastructure remains, including the remnants of British-constructed seawalls bordering the settlements. Now covered by several inches of water, these cement and stone ruins serve as a kind of archive of the requisites to making this area an *actually* habitable zone. As the Chief described it, the gradual erosion and sinking of all sandy settlements is somewhat inevitable in the Sherbro Estuary; the deltaic system is constantly in flux and habitable land is on an endlessly shrinking trajectory ushering in forms of existential threat. But the predicament that Konehun's inhabitants find themselves in is not necessarily a result of changing weather, deforestation, rutile mining, or sea level rise. Seawalls make some areas livable, the Chief explained, and in Konehun, *there is little in the way of resources to construct one*. His rendering of the situation, in other words, emphasized that the changes he observed in his village's ecosystem and infrastructure were, in fact, determined by a web of sociohistorical forces (the island was a hub in the transatlantic slave trade before becoming a British colonial outpost) whose intersections may be under-examined in academic and expert accounts (Ferdinand 2022).

In 2015, Konehun was one of several sites in the region selected for a \$48.9 million United States Agency for International Development (USAID) conservation and climate change resilience project, the West Africa Biodiversity and Climate Change (WA BiCC) program (USAID project website has been removed). Some of the WA BiCC program's activities centered on restoring coastal mangrove forests that had been ‘depleted’ by communities in order to meet their needs—using the wood for fire and smoking fish, supposedly unaware of the vital role these trees can play in preventing erosion and coastal flooding. The project employed many local educators to advise and monitor the project. In 2021, the WA BiCC funding wrapped up, and its enduring effects turned out to be more symbolic than material. Individuals involved in the project’s governance were recruited to participate in our ethnographic research and were eager to recount what they had learned about the potential for mangroves to help with flooding (in the absence, they noted again, of a *real* constructed seawall). But the physical traces of the project are limited: an approximately one-acre site where Konehun residents are waiting for mangroves to grow back, and which they hope will break some of the destructive waves that come during storm surges. Many of the other sites that were ‘restored’ have been cut down for firewood to smoke fish, or given to livestock for food (Mukpo 2022).

Even the ocean fish stocks are precarious: one of the island’s denizens remarked, “It can go a whole week with no fish in the market in Bonthe.” When asked why—“because of the overfishing, of course.” Yet despite media documentation of illicit fishing by foreign fleets (Yeung 2022)—and his own observance of their trawlers at work—when asked what happened to the fish, he replied, “Maybe they went back to where they came from.” Such attributions remind us that counteradaptation is situated and partial: when distant or deliberately obscured

forces structure an ecological niche, people must make sense through opacity, sometimes redescribing systemic drivers in ways that naturalize and depoliticize the phenomenon.

Counteradaptation names the repertoire through which residents diagnose and act within their socio-ecological niche, but these diagnoses are situated and partial: while some link present vulnerabilities to long histories of the slave trade, (neo)colonial extraction, and carbon overshoot, others—potentially shaped by the logics of environmental aid—depoliticize systemic pressures by redescribing them as natural phenomena. Such sense-making nonetheless does practical work. By recognizing antagonists and resources across ecological and political timescales, people reorganize claims and redirect responsibility outward. In this light, mangrove-restoration schemes such as the WA BiCC program appear as slight material interventions against deeper infrastructures of dispossession, even as they also program/curate how communities come to understand socio-ecological change (Bhambra and Newell 2023; Horton et al. 2021). Meanwhile, expert framings that collapse these entanglements into technical fixes further depoliticize purposeful underdevelopment, recasting structural violence as a set of managerial problems to be solved (Little and Reinhardt 2007; Ferguson 1994).

Case Study 2:

In the forest village of Quidador in a mountainous section of Kono District, dozens of miles outside the district capital on barely traversable roads, farmers told us about startling recent changes in rain patterns. This year, the mid-rainy season cacao harvest, a lifeline before other crops were ready, had not yet occurred at all. The farmers were clear about the alternative work they had turned to: scaling up (illicit) harvests of timber from the dense forests in which they and

their families had farmed for years. Though the Sierra Leone Government had officially declared a series of on-and-off moratoria on timber exports given international concern about the rate of deforestation in the region, buyers were still coming in from the district capital (Inveen 2020; United Nations Office on Drugs and Crime 2021). “We know the timber harvesting changes the forest,” one farmer explained. “Without the trees the rain depletes the soil layers more rapidly. Before, you could plant one region 2-3 times; where they’ve cut timber, maybe you can only now do once.” But, the farmer added, “we are capable of recognizing this and regulating how many trees we cut.”

Across the Global South, mitigation and adaptation initiatives routinely collide with communities’ imperatives to secure livelihoods and with locally situated critiques of ‘conservation’ (Oates 1999). As our interlocutors emphasized, turning to ecosystem-exploiting work such as logging is less a repudiation of conservation than a pragmatic response under severe constraint. In Quidador, residents face entwined crises: volatile rains alongside purposeful underdevelopment wrought by centuries of foreign extraction—now congealed by the Global North’s fetishization of “pristine” West African forests as sinks for its carbon overshoot. Read through counteradaptation, logging appears as a situated response to selection pressures engineered by colonizers, corporations, and countries of the Global North.

Elsewhere in Kono, other forms of ecologically damaging resource extraction are proceeding unfettered. Several miles away from Quidador, in Kumaiyo, for instance, we met a community in the midst of a gold rush. The richest flats had been secured by a Chinese company that had made arrangements with higher levels of government to expropriate the minerals, but hundreds of

young men from around the region had traveled to Kono in the last few years to take part in the artisanal excavations that were deforesting and demolishing the riverside hill. The Town Chief there expressed to us ambivalence about what was happening in his village: dissatisfaction with the Chinese enterprise (especially since their neocolonial concessionary model transported Chinese migrants to fully staff the operation), but gratitude for the small bits of revenue generated through the small-scale mining. On the wall of his house, he had hung an international NGO's information pamphlet on mercury poisoning. "Yes, I am aware of the risk of these chemicals that we use," he explained, referencing the small-scale miners. "But we have not seen [such poisoning] yet."

At the foot of the river that runs through town and that is used to irrigate the town's rice fields, groups of young men and school-aged children now run heavy machinery to wash gravel and silt brought down from the hillsides. In the final step of processing, the fine sand is mixed with luminescent globs of mercury, which helps separate out the gold (the toxic impacts of mercury exposure among individuals in the artisanal mining community are well described (WHO 2013)). The runoff from the washing had turned the entire river opaque. The Chief explained that the fish and frogs that local people used to eat had all seemed to have left the area since the rush began. Trees and grasses on the riverbanks had died. But every person we spoke to in the community was overjoyed at the "gift from God" to Kumayo village: the gold that had brought a steady, albeit time-limited, trickle of income to those involved in the trade. The outskirts of the village were filled with huge mounds of tailings that had already been sifted through. The cost of all this was evident: destruction of arable land, and it was only a matter of time before they would run

out of earth to sift through. But with gold in the ground and rural poverty ubiquitous, the only possibility was to capitalize on this financial opportunity.

The selection environment in Quidador and Kumayo today has been engineered by coercive projects of accumulation over centuries: chattel slavery and forced labor (Lovejoy 1983); concessionary regimes for timber and diamonds (Campbell 2004; Munro and van der Horst 2016); colonial forestry and land codes that criminalized subsistence extraction (Fairhead and Leach 1996); and postcolonial liberalization and structural adjustment that dismantled agrarian supports (Mkandawire and Soludo 1999). Layered atop these are the Global North's historic and ongoing over-emissions of greenhouse gasses, which export climatic volatility to places like rural Kono (Bumpus and Liverman 2008). These upstream restructurings sculpt Kono's socio-ecological niches by amplifying climate volatility and expropriating the resources required to promote habitability. Against this backdrop, the turn to illicit timber harvesting and artisanal mining can be read as counteradaptation—improvised strategies for sustaining livelihoods within niches that have been historically configured by extraction and the unequal distribution of climate risk.

Case Study 3:

As international aid agendas within the country increasingly focus on climate change, they bring with them novel ways of explicating the country's abysmal Human Development Index (ranked 185 out of 193 countries in 2023) (UNDP 2025). “Yes, I’ve heard of climate change,” Abu, a high school student, told us in Freetown, explaining he had learned of the concept in school and on social media. “They say it is when we do things like cut down our trees and put too much

trash in our gutters, then we get the flooding.” As with the moral grammars of public health crises elsewhere (see Keshavjee 2014; Chigudu 2020), these regimes of education and intervention cast contemporary hardships as the result of citizens’ own failings, obscuring the socio-historical forces that produce inequity and ecological precarity. Well-intentioned signboards imploring citizens to “Stop Climate Change” by avoiding deforestation (Figure 3) now dot roads all over the country (Figure 3). Yet such campaigns fail to situate climate change within the deeper histories of slavery, colonialism, predatory debt (Sultana 2022), structural racism (Deivanayagam et al. 2023), and illicit financial flows (UNCTAD 2020) that have long shaped Freetownians’ vulnerability.”

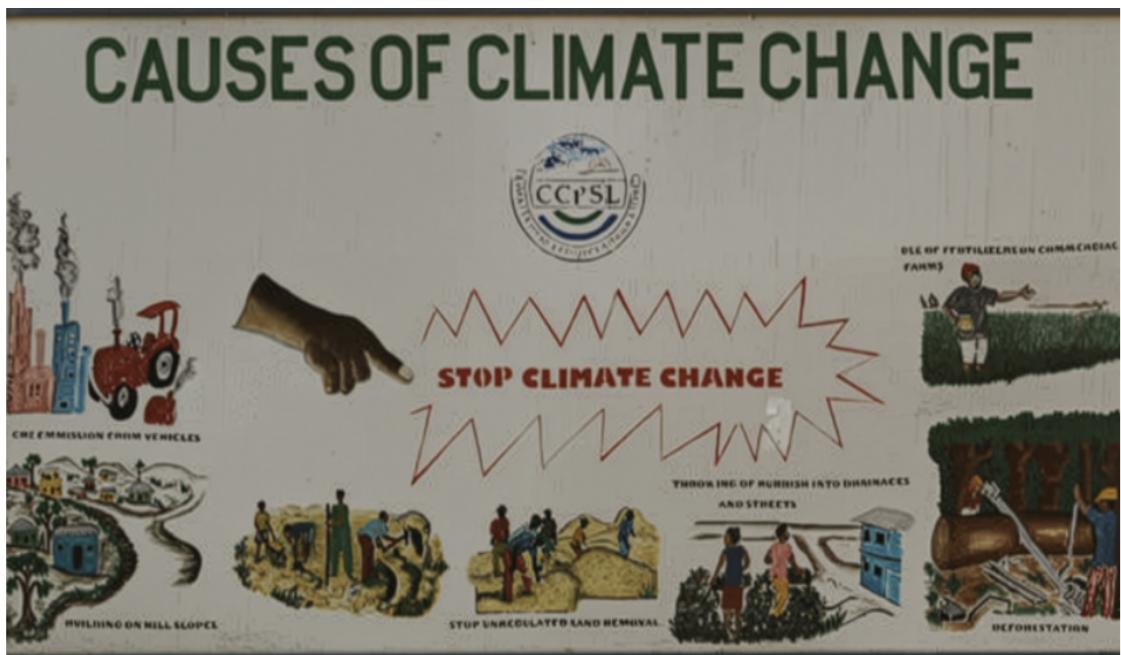


Figure 3. Stop Climate Change billboard in Sierra Leone.

It is hard to know what to make of ordinary people’s relationships with these messages that are at once abstract (Abu said he had not personally noticed any changes in the climate, but still

fluently deployed the term), convey impossible mandates (there is no trash collection system in the country; timber is a crucial resource for cooking, construction, as well as securing livelihoods); but still come from afar (labeled with the imprimatur of foreign funders) and identify a behavior that, as Abu had once said, demonstrates that “we Sierra Leoneans do not love ourselves.”

Harnessing articulations of what the future holds can also become a kind of currency in extraverted political contexts like Sierra Leone, a place where political leaders’ legitimacy is defined by their ability to broker acclaim and resources from afar (Bayart 1993). Freetown’s mayor, Yvonne Aki-Sawyer, for instance, has become something of a donor-darling politician in large part through her invoking climate change as *the* critical issue that Freetownians face and will face in the coming decades. Educated in the UK and with a background in management, Aki-Sawyer has been hailed internationally as a maverick leader in a political scene saturated by postcolonial patronage politics and graft. She has won acclaim from the likes of Jeff Bezos, Michael Bloomberg, and George Soros’s Open Society Foundations. Energetic and charismatic, Aki-Sawyer has relentlessly argued that better management systems and other technocratic fixes to Freetown’s development and housing regimes are the key to bring about transformation in the deeply impoverished city that faces widespread flooding, has no reliable source of electricity, and whose informal settlement neighborhoods are characterized by ubiquitous abject poverty. She too has steered away from naming the geopolitical forces and structural arrangements that have underdeveloped the city, instead focusing her agenda on enforcing the local taxation code that collects pittances from struggling petty traders as well as mandating collective street cleaning each month.

One of Aki-Sawyer's most globally acclaimed projects is "Freetown Treetown," featured as a TED Talk and widely promoted by Bloomberg's Global Mayor's Challenge, which aimed to catalyze Freetown's schoolchildren to replant one million trees with the assistance of a tree-tracking mobile phone application. None of those in Sierra Leone we interviewed brought up this initiative, and there is little evidence that much has transpired. (Indeed, six years into her tenure and with mounting tensions with the national government, even the most visible of her initiatives—the monthly street-cleaning days—seemed to have ground to a halt). In her interviews for Euro-American audiences, Aki-Sawyer has offered a nuanced explanation for why replanting trees within Freetown is important for climate change at a local level: reforestation, she argues, can prevent landslides (like the catastrophic 2017 mudslide that killed 1,141 people and left more than 3,000 unhoused (Glynn 2018)) and maintain moisture layers around the city to stabilize shifting weather patterns. But these are often lost to the broader message that, as Abu explained, Sierra Leoneans' cutting down their own trees has led to the "climate change" that will make life even more difficult for them in the future. The fact that the country's trees are one of the few remaining natural resources available to extract in pursuit of some economic stability goes unsaid.

Even so, few Freetowners we spoke to independently described changing climates as a top concern. As with the former USAID staffer interviewed in Konehun, climate change seemed a script heard and reproduced with a kind of dispassionate repetition (Pinto 2008; Benton 2015). However, multiple interlocutors shared their own critiques of the ways that Aki-Sawyer seemed to be "captured" or so closely-allied with Bloomberg, Bezos, and other wealthy agents of the

neoliberal agenda; her widespread acclaim from outside of the country and pretense of having “the answers” seemed suspicious when juxtaposed with the rising costs of fuel, food, serial public health crises, endlessly gridlocked traffic (Sierra Leone is one of only three countries in the world without working traffic lights), and a currency collapse that seemed to thrust more Freetownians into devastating poverty every year. “Too much European talk-talk,” Abu said of the mayor.

Abu’s fluent repetition of a school/social-media script (“we cut trees; we litter; then we flood”), the proliferation of donor billboards, and the mayor’s “Treetown” app all operate as semiotic devices that recode structural deprivation as ecological determinism, with attendant mandates for behavior. In this terrain, talk of futures becomes currency in an extraverted political economy: elites accrue legitimacy by aligning with global climate imaginaries, while ordinary residents are interpellated as the proximate cause of risk.

Building from this reading, we treat environmental aid discourse as a story technology that attempts to organize how people counteradapt (Frankfurter et al. 2024). Curricula, signage, TED-style projects, and app-based audits are inscription devices that compress a geographically broad and historically long determinative web (colonial underdevelopment, illicit financial flows, austerity urbanism) into legible metrics of local behavior. That compression does political work: it de-scales responsibility, converting reparations obligations into techno-managerial consultant contracts. In short, climate “talk-talk” becomes an anti-politics machine for the city, where adaptation is framed as civics rather than redistribution (Ferguson 1994).

Counteradaptation names how residents navigate and revise this field. In his ambivalence, Abu—knowing the script, not perceiving local climatic change, yet living its mandates—distinguishes symbolic compliance from material priorities (fuel, food, transport, rent). Likewise, skepticism toward donor-courting managerialism (“captured” leadership, visible but low-leverage clean-ups, tree-tracking apps) reflect a situated diagnosis of interventions optimized for auditability rather than justice.

Case Study 4:

We met Smith at the far end of the Kroo Bay slum, a dense neighborhood in a valley of central Freetown spilling out into the Atlantic Ocean. Concrete structures by the main road turn to corrugated zinc; in the heart of the slum, the ground is made of accreted layers of refuse. Pigs scour for scraps among the rivulets and pathways. Kroo Bay, named for the ethnolinguistic group of mariners who initially inhabited the region and maintained connections with Liberian and Nigerian cities, has grown exponentially as a somewhat emblematic sequela of urbanization that has characterized demographic change across West Africa in the wake of post-neoliberal economic collapse. Kroo Bay has had several infamous floods that spurred urgent humanitarian action (Remoe 2015). Premature death, on a large scale, is a proximate presence. A number of NGOs operate dedicated programs in the community, but all of those we spoke with in the neighborhood said that the graft occurring at the upper levels of town leadership prevented nearly any resources from reaching the poorest inhabitants.

Smith lives in the last stick-and-corrugated-zinc shack in the community, only a few feet from the Atlantic Ocean. Beyond the coastline, sticking out of the water, long wooden poles

demarcate the sites of future shacks (Figure 4). Men continue to work on the “embankment,” piling bags of sand, dirt, gravel, and trash on the seafloor to make a solid foundation for life, literally out of the sea. “We don’t know where they’ll stop,” Smith told us. “The police said we should stop building out [into the sea], but the [neighborhood] Chairman is still taking money for [further construction].”



Figure 4. Kroo Bay slum.

Smith was born in Kroo Bay and completed more school than most of the slum’s inhabitants thanks to the financial sponsorship of a family member. Near the end of high school, that family member suffered an accident and injured her hand; within months, Smith’s opportunity to escape the slum via education had vanished. “This accident ruined it. The money that she would have used to help us with school fees they used to save her life. We tried, but we couldn’t get any

family to come to our rescue because my mother's own people were all fighting for their own children." Now, Smith makes what he can by cutting neighbors' hair, but this very last plot in one of the most precarious slums in Freetown is all he can afford.

Smith told us of the struggles of maintaining a life here: during severe rains, water rushes down from the mountains in the city, meeting unpredictable surges from the Atlantic Ocean. His house and surrounding area flood, and this seems to be happening more and more. "This season is worse—especially the wind," Smith explained. During nearly every storm his shack had become submerged in water. He told us that he had built high shelves where he places his toddler children to wait out the floods overtaking their home. "After the water goes we can wipe it, wash it with other clean water. From there we make a fire, the heat dries the place." In some ways, he told us, the season this year seemed worse than those past—the wind that prevents any sleep, the sun more intense—but the flooding, he explained, was fundamentally of the community's own making. "We have gone inside the sea too much."

Our conversation turned to why the wind seemed so much more intense:

Just like what you said, the climate change. The breeze is too heavy—at times it can blow until the roofs come off.

What do you think causes climate change?

I believe that it is the trees that we cut down, because they help to seize the wind. So if we cut them all down the breeze will disturb us.

Who taught you about that?

From school.

And the rain?

The rain is not too much like past seasons. This season, it's two things that bother us too much: the breeze and the sun.

What is the worst challenge you have here?

This flooding. If you see the flooding come, you won't have any sleep that night.

Within this precarious terrain, Smith's prospects are sharply curtailed: staying in Kroo Bay, where rent is marginally affordable and kin networks provide fragile security; or imagining

uncertain forms of migration abroad. He roundly rejected the possibility of reverse-urbanization (returning to his family's village and engaging in agriculture), often somewhat naively upheld by development experts as the easy solution to the untenable urbanization. "I'm from here," he explained. "I know nothing about that kind of work."

Smith's story brings into view counteradaptation as a multi-layered practice. Materially, he and his neighbors carve out space for life by extending Kroo Bay into the Atlantic with foundations of trash and sand, improvising shelves to keep children above floodwaters, and drying their homes after each inundation. These material acts are responses to the sedimentation of historical, global, local, and ecological forces—slave-trade legacies that concentrated poverty along the coast, carbon-intensive development elsewhere that drives rising seas, the corruption of neighborhood leadership that monetizes encroachment, and the violent materiality of floods and winds.

Conclusion: A Prolegomenon to Future Environmental Social Science

Building on several decades of political-ecological research, we propose that a theory of counteradaptation can orient contemporary studies of climate change by making legible the antagonisms, inheritances, and improvisations through which socio-ecological systems are structured and navigated. The case studies above show how dominant adaptation paradigms skew the evidential landscape, erasing political economy and naturalizing 'managed inequality' as resilience (Mikulewicz 2019).

The theory further responds to Paul Cilliers' notion that every engagement with complex systems necessarily entails normative considerations—selecting variables, drawing system boundaries, privileging scales, and encoding values—such that adaptive frameworks are never neutral (Cilliers 1998). Once we acknowledge that ecological complexity is not compressible and that all efforts to reduce such complexity are value-laden, it follows that such frameworks can be interrogated for the commitments, explanations, and interventions they tend to privilege. As such, counteradaptation emerges as a more useful analytic, unmasking ideological presuppositions by expanding behavioral drivers beyond biophysical hazard to include power-knowledge, socio-historical determinants, and policy incursions (Rorty 1982). The emphasis on antagonistic, relational dynamics—how adaptive gains for some are made through institutional designs and carbon trajectories that reallocate costs to others—renders visible ‘selective pressures’ driven by coloniality as much as by climate.

The study of ecology is an engagement with plurality. The ‘limitations’ of complexity studies therefore create “opportunities for collaboration with other fields of study and, even more importantly, with non-academic stakeholders, in the effort to explore different possibilities and models...” (Preiser and Woermann 2016). Anthropology and STS can further situate experience-near practices of counteradaptation alongside hegemonic narratives, (Beck et al. 2024; Jasanoff 2010; Callison 2014; Crate and Nuttall 2016; Barnes et al. 2013; Escobar 1999) elucidating the material and superstructural forces that configure ecological niches. Such grounded accounts can demonstrate how habitability hinges on the ways regimes of power-knowledge and dispossession are arranged, rather than on climatic change alone.

Author contributions

ETR designed the study. RF, ZH, and ETR conducted the literature search. RF, SDK, SC, MBB, JDK, and ETR collected data. RF, SDK, ZH, SC, MBB, JDK, MPF, MB, JHJ, and ETR interpreted the results. RF, ZH, and ETR wrote the article. RF, SDK, ZH, SC, MBB, JDK, MPF, MB, JHJ, and ETR edited and revised the article. RF, SDK, ZH, SC, MBB, JDK, MPF, MB, JHJ, and ETR approved the final version. ETR is responsible for the overall content as guarantor.

Statements and Declarations

Ethical considerations

The study was approved by the Sierra Leone Ethics and Scientific Review Committee and the Harvard Institutional Review Board (IRB23-0843).

Consent to participate

Verbal consent was obtained from research participants as per the approved protocol.

Declaration of conflicting interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Data availability statement

The data that support the findings of this study may be available on request from the corresponding author, ETR, but will require approval from the requestor's IRB and the Sierra Leone Ethics and Scientific Review Committee. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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