

Ecological Apartheid: Climate Inequality, Enclaves, and the Privatization of Survival in Science Fiction

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Article Detail:	Abstract
Received: 10 Sep 2026; Received in revised form: 06 Oct 2026; Accepted: 11 Oct 2026; Available online: 16 Oct 2026 Keywords— ecological apartheid, climate inequality, science fiction, environmental justice, climate capitalism, terraforming, enclaves, privatization, ecological crisis ©2026 The Author(s). Published by International Journal of English Language, Education and Literature Studies (IJEEL). This is an open access article under the CC BY license (https://creativecommons.org/licenses/by/4.0/).	<i>Climate change is often described as a universal crisis, yet its consequences and the capacity to respond to them are profoundly unequal. Contemporary science fiction increasingly imagines futures in which environmental security becomes a commodity accessible primarily to wealthy populations, while vulnerable communities remain exposed to pollution, drought, resource scarcity, extreme weather, and ecological displacement. This article examines Arthur C. Clarke's The Sands of Mars, Frank Herbert's Dune, Kim Stanley Robinson's Mars Trilogy and The Ministry for the Future, Paolo Bacigalupi's The Water Knife, Octavia E. Butler's Parable of the Sower, and Neill Blomkamp's Elysium to study the relationship between environmental inequality, technological privilege, enclosure, and the privatization of survival. Drawing on Rob Nixon's concept of slow violence, Jason W. Moore's critique of capitalist ecology, Chris Pak's scholarship on terraforming, and recent work on climate apartheid, the article distinguishes "ecological apartheid" from the broader category of climate inequality. It proposes ecological apartheid as a literary condition in which access to habitable environments becomes spatially, technologically, and economically segregated. The article argues that science fiction increasingly replaces the idea of a shared ecological catastrophe with divided ecological futures: protected enclaves for privileged populations and degraded environments for those without sufficient economic or technological power. Such narratives demonstrate that the central ecological question of the future is not simply whether humanity can survive environmental crisis, but who will possess the means to survive it safely, comfortably, and with control over the environments in which survival takes place.</i>

Introduction

Climate change is frequently represented through the language of planetary crisis. Rising temperatures, droughts, floods, sea-level rise, pollution, food insecurity, and resource depletion are described as threats to humanity as a whole. Yet the material experience of environmental crisis is profoundly unequal. Communities that have contributed least to

ecological degradation are often among those most exposed to its consequences, while wealthy individuals, corporations, and states possess greater access to infrastructure, technology, mobility, insurance, and protected environments. Climate change therefore cannot be understood only as a crisis of nature. It is also a crisis of distribution: who receives

environmental protection, who bears ecological risk, and who possesses the resources necessary to adapt?

Recent scholarship has increasingly described this inequality through the concept of “climate apartheid.” Jennifer Rice, Joshua Long, and Anthony Levenda argue that climate responses themselves can reinforce segregation, displacement, and discrimination when climate-oriented infrastructure and policies protect privileged populations while making already vulnerable communities more precarious. Nick Wood and Faeza Meyer similarly distinguish between the “climate privileged” and the “climate precariat,” arguing that speculative fiction can expose the unequal social consequences of climate change and challenge dominant narratives of environmental crisis. Their intervention is particularly important because it connects environmental inequality with narrative justice: the question of who gets represented as vulnerable and who gets imagined as capable of survival is itself political.

The present article builds upon this scholarship but uses the term “ecological apartheid” more specifically to examine the spatial and technological organization of environmental privilege in science fiction. Ecological apartheid refers to a condition in which populations experience fundamentally different ecological realities because access to habitable environments is controlled by wealth, political authority, technological capacity, or ownership. It may take the form of a gated climate-controlled community, a privately protected water supply, an artificial habitat, a corporate territory, or an extraterrestrial settlement accessible only to privileged populations. The defining feature is not simply unequal exposure to climate change but the active separation of populations according to their ability to secure environmental safety.

Science fiction is particularly useful for examining this possibility because it converts abstract environmental inequality into spatial forms. Neill Blomkamp’s *Elysium* divides humanity between an impoverished Earth and a technologically protected orbital habitat. Paolo Bacigalupi’s *The Water Knife* transforms water scarcity into a mechanism of political

and economic exclusion. Frank Herbert’s *Dune* links ecological resources to imperial power and social organization. Octavia E. Butler’s *Parable of the Sower* reveals the fragility of protected communities under conditions of ecological collapse. Kim Stanley Robinson’s *Mars Trilogy* examines competing political and ecological visions of planetary transformation, while *The Ministry for the Future* imagines institutional alternatives to privatized responses to climate catastrophe.

The argument also engages with scholarship on terraforming. Chris Pak demonstrates that terraforming in science fiction is not merely a technological process but a literary site where ecology, colonization, habitation, environmental philosophy, and political power intersect. His study traces the development of terraforming from early planetary engineering narratives to the environmentally conscious fiction of Robinson, showing how the transformation of other worlds can become a means of thinking about humanity’s relationship with Earth itself. Aditya Raj’s doctoral study, *Science Fiction and Terraforming: A Critical Study of Select Works of Kim Stanley Robinson* similarly examines terraforming as a technological, ecological, ethical, and political process in Robinson’s fiction. The relevance of this scholarship to the present argument lies in a shift from the question of transforming environments to the question of controlling access to transformed environments.

The Enclave as an Ecological Technology

One of the most revealing forms of ecological apartheid in science fiction is the enclave. The ecological enclave is not simply a refuge from environmental crisis. It is a technologically protected space whose security depends upon restricted access. It can be a gated community, a fortified city, an orbital habitat, an underground settlement, or a privately controlled ecological zone. Its political significance lies in the conversion of environmental safety into a commodity. Neill Blomkamp’s *Elysium* offers the clearest visual representation of this structure. The wealthy population has abandoned an environmentally degraded Earth and moved to an enormous orbital habitat equipped with advanced

medical technology, artificial landscapes, and controlled living conditions. The Earth is consequently transformed into a space of ecological and economic abandonment, while *Elysium* functions as an artificial environment of privilege. The film makes class inequality spatially visible: the wealthy literally live above the poor.

The significance of *Elysium* lies in the fact that environmental protection is not distributed publicly. It is privatized. The privileged do not repair the ecological conditions of Earth; they construct an alternative habitat for themselves. Ecological security becomes a form of property. The orbital enclave therefore represents an extreme version of a process already visible in contemporary societies, where wealth increasingly determines access to safe housing, clean environments, reliable infrastructure, and medical protection. The ecological enclave also exposes a limitation in technological approaches to environmental crisis. Technology is not inherently egalitarian. Its capacity to protect human life depends upon who controls it and how its benefits are distributed. A climate-controlled environment can function as a public resource or as a private fortress. *Elysium* represents the latter possibility. Rob Nixon's concept of slow violence is useful here because environmental inequality rarely appears as a single spectacular event. Pollution, drought, infrastructural neglect, and ecological degradation accumulate gradually. The privileged enclave conceals this slow violence by separating its inhabitants from its consequences. The enclave does not eliminate ecological destruction; it externalizes it.

Terraforming, Colonialism, and Environmental Privilege

The politics of ecological enclosure becomes more complicated when science fiction moves from Earth to other planets. Arthur C. Clarke's *The Sands of Mars* is an important early example of the terraforming tradition. The novel imagines Mars as a planetary environment that can potentially be modified to support human settlement. Chris Pak identifies terraforming as a major science-fictional motif through which writers have imagined humanity's technological

relationship with planetary environments. He also demonstrates that the terraforming tradition is connected to colonial narratives and ideas of landscaping, habitation, and environmental mastery. The relevance of terraforming to ecological apartheid is that environmental transformation requires control. Whoever possesses the scientific and technological capacity to modify a planetary environment acquires enormous power over the conditions under which others live. Terraforming therefore raises a question that is frequently overlooked in discussions of planetary engineering: who owns the transformed environment?

Kim Stanley Robinson's *Mars Trilogy* makes this question particularly visible. *Red Mars*, *Green Mars*, and *Blue Mars* present competing visions of Martian development involving corporations, governments, scientists, revolutionaries, and ecological thinkers. Pak notes that the trilogy increasingly foregrounds the political-economic importance of multinational corporations and the competing interests surrounding planetary development. Terraforming consequently becomes inseparable from the question of who has authority over Mars. Raj's doctoral study of Robinson's terraforming narratives further emphasizes the relationship between technological intervention and ecological ethics. The significance of this scholarship for the present discussion is that terraforming should not be understood simply as an optimistic technology of environmental improvement. It is also a political process through which decisions are made about what an environment should become and whose interests that transformation should serve. The ecological enclave on Earth and the terraformed planet therefore share an underlying logic. Both involve the production of controlled environments. In *Elysium*, technology produces a protected habitat in orbit. In terraforming narratives, technology produces or modifies planetary environments. In both cases, the crucial question is access. Environmental transformation becomes politically dangerous when the ability to create habitable space is monopolized.

Water, Scarcity, and the Privatization of Survival

Paolo Bacigalupi's *The Water Knife* shifts the focus from planetary engineering to resource scarcity. Set in a drought-stricken American Southwest, the novel imagines water as the most valuable political and economic resource. Communities and individuals are forced to confront a future in which access to water determines mobility, security, property, and survival. The novel demonstrates that environmental inequality is not produced solely by the absence of resources. It is also produced through unequal control over resources. Water becomes a mechanism of political power because powerful institutions can determine who receives it and who is excluded. The environmental crisis therefore becomes a crisis of ownership. This distinction is important because climate change does not affect populations in identical ways. A wealthy individual can purchase bottled water, relocate, install cooling systems, obtain insurance, or move to a less vulnerable region. A poor individual may have none of these options. Environmental vulnerability is consequently transformed into an economic hierarchy.

This is precisely the distinction emphasized by Wood and Meyer in their discussion of climate privilege and climate precarity. Their argument is that speculative fiction can challenge the assumption that climate change produces a common future by showing how environmental consequences are mediated through existing structures of class, geography, race, and political power. *Dune* provides a contrasting but related ecological model. On Arrakis, water determines social organization and political power. Frank Herbert does not simply represent water as a scarce commodity; he makes scarcity the foundation of an entire culture. The Fremen develop collective ecological practices that allow them to survive within a hostile environment. The contrast between Arrakis and Bacigalupi's American Southwest is significant. In *The Water Knife*, water scarcity becomes deeply entangled with corporate and political control. In *Dune*, ecological adaptation produces forms of collective knowledge and cultural practice. Herbert therefore suggests that scarcity does not automatically produce privatization. Social organization determines whether scarce resources become instruments of domination or

foundations for collective survival. This distinction is crucial to ecological apartheid. The problem is not that resources become scarce; it is that access to ecological resources becomes structurally segregated.

The Fragility of the Protected Community

Octavia E. Butler's *Parable of the Sower* complicates the fantasy of permanent ecological enclosure. The novel depicts a California devastated by drought, economic inequality, violence, privatization, and institutional collapse. Lauren Olamina's community attempts to protect itself behind walls, but those walls eventually prove insufficient. The significance of Butler's novel lies in its critique of the belief that environmental crisis can be contained spatially. The protected community may delay exposure to ecological violence, but it cannot permanently isolate itself from the systems producing that violence. Water scarcity, economic collapse, migration, and social instability eventually penetrate the boundaries of the enclave.

Butler therefore provides an important counterpoint to *Elysium*. In *Elysium*, the privileged appear to have solved the problem of ecological vulnerability by leaving Earth. In *Parable of the Sower*, protective walls cannot guarantee long-term security. Ecological systems and social systems remain interconnected. This is consistent with Pak's argument that terraforming narratives function as sites of ecological and political inquiry because they bring questions about human and nonhuman relationships into the structure of world-building. The fantasy of complete environmental control is repeatedly challenged by the complexity of ecological interdependence.

Robinson's *The Ministry for the Future* similarly rejects the idea that climate survival can be achieved through isolated technological enclaves. The novel presents climate change as a planetary problem requiring institutional transformation, economic restructuring, and collective action. Mikes and New argue that Robinson imagines a "hybrid" political-economic response in which governments, markets, technological innovation, and civil society cooperate rather than allowing either corporations or states to act alone. The contrast is therefore between privatized

survival and collective adaptation. *Elysium* asks what happens when the wealthy escape ecological crisis. *The Ministry for the Future* asks what might happen if institutions instead attempt to transform the conditions producing ecological vulnerability.

Climate Apartheid and Ecological Apartheid

At this point, the distinction between climate apartheid and ecological apartheid becomes important. Climate apartheid describes the unequal distribution of climate vulnerability and the ways in which climate policies can reproduce existing structures of segregation and privilege. Rice, Long, and Levenda demonstrate that climate-oriented infrastructure can itself secure privileged populations while excluding or displacing marginalized communities. Ecological apartheid, as used here, is narrower. It focuses on the spatial and technological production of different ecological realities. It asks not only who suffers from climate change but who can purchase protection from it. It therefore includes climate-controlled enclaves, artificial habitats, privately controlled resources, protected cities, orbital settlements, and technologically engineered environments.

The distinction is useful for science-fiction studies because science fiction frequently represents environmental inequality through spatial metaphors. *Elysium* places the wealthy above Earth. *The Water Knife* divides territories according to access to water. *Dune* divides political power according to control of ecological resources. The *Mars Trilogy* divides visions of planetary development according to competing forms of political and ecological authority. Parable of the Sower places vulnerable communities behind walls that ultimately fail. *The Ministry for the Future* imagines the possibility of replacing fragmented survival strategies with planetary institutions. These texts therefore transform ecological inequality into geography. The future becomes divided not simply between rich and poor but between different qualities of habitat.

The Privatization of Planetary Survival

The most disturbing implication of ecological apartheid is that environmental survival itself can become a commodity. As climate change intensifies,

technologies for adaptation may become increasingly valuable: artificial cooling, desalination, climate-controlled architecture, drought-resistant agriculture, geo-engineering, advanced medical systems, protected transportation, and eventually extraterrestrial habitats. Science fiction has repeatedly anticipated this possibility. The technological enclave is attractive precisely because it offers an apparently simple solution: instead of changing the entire social system, construct a protected environment for those who can afford it. Yet this model contains a fundamental contradiction. Environmental systems do not respect the boundaries of private property. Atmospheric processes, oceans, biodiversity, disease, and climate systems are interconnected. A privately protected environment may reduce vulnerability temporarily, but it cannot indefinitely escape the larger ecological system.

Recent scholarship on climate engineering in Robinson's *The Ministry for the Future* and Neal Stephenson's *Termination Shock* makes this tension explicit. Climate engineering can become an instrument of "green capitalism" if large-scale interventions remain controlled by state-corporate interests rather than being treated as collective ecological infrastructure. The issue is therefore not whether technological intervention is good or bad but who controls technological intervention and for whose benefit. This returns the discussion to terraforming. Pak argues that science-fictional terraforming offers a way of thinking about how humans shape and are shaped by planetary environments. If the technological modification of planetary environments becomes increasingly feasible, the political question of environmental ownership becomes unavoidable.

The ecological future could consequently produce two radically different possibilities. In one, environmental technologies become public infrastructure designed to reduce vulnerability collectively. In the other, they become private technologies designed to protect wealthy populations from environmental risk. The first represents ecological adaptation as collective survival. The second represents ecological apartheid.

CONCLUSION

Science fiction has long imagined humanity transforming hostile environments, colonizing other planets, enclosing communities, and developing technologies capable of altering ecological conditions. What becomes increasingly visible in contemporary ecological fiction is that these possibilities are also questions of social distribution. Environmental security is not automatically universal. It can become a privilege. The concept of ecological apartheid identifies this possibility. Unlike the broader concept of climate apartheid, which emphasizes unequal climate vulnerability and discriminatory climate responses, ecological apartheid focuses on the spatial and technological segregation of environmental security. It describes a future in which some populations inhabit protected, technologically managed environments while others remain exposed to ecological degradation.

Elysium provides the clearest image of this future, transforming class inequality into an orbital geography. *The Water Knife* demonstrates how scarcity can make natural resources instruments of political exclusion. *Dune* presents ecological knowledge as an alternative to resource privatization. *Parable of the Sower* exposes the fragility of physical enclaves. Clarke's *The Sands of Mars* introduces the technological dream of planetary environmental transformation, while Robinson's *Mars Trilogy* transforms that dream into a complex debate about ecology, ownership, science, and political authority. *The Ministry for the Future* offers a contrasting vision in which climate crisis demands collective institutional action rather than private escape.

The scholarship of Chris Pak is particularly important because it demonstrates that terraforming has always been more than a technological fantasy: it is a literary space for thinking about ecology, environmental philosophy, colonization, habitation, and humanity's relationship with planetary environments. The most dangerous future may consequently not be a planet on which everyone is equally exposed to ecological catastrophe. It may be a planet divided into protected and abandoned environments: technologically secured enclaves for those who can afford them and increasingly precarious

landscapes for those who cannot. In such a future, survival itself becomes privatized. Science fiction asks us to confront this possibility before it becomes reality. The ecological question is no longer simply whether humans can save the planet. It is whether the technologies developed to save human life will be used to protect everyone—or whether they will create a world in which some people can purchase a future while others are left behind.

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