



REIMAGINING THE HUMAN- ENVIRONMENT RELATIONSHIP

Governing Prometheans in the Anthropocene: Three Proposals to Reform International Environmental Law

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This paper forms part of the volume *Reimagining the Human-Environment Relationship* for Stockholm+50. This curated collection of ideas captures, interrogates, and elevates alternative paradigms of the human-nature relationship – existing and new, and from various disciplines and societies – creating a space to recast our relationship with the environment and inform future policymaking.

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Introduction

Humans have become powerful geological planetary agents. Like volcanoes, meteorites, and earthquakes, we are exerting a telluric force that is changing the planet in ways that no living beings before us have managed to do. We have nurtured this force at least since the start of the Industrial Revolution's Great Acceleration in the 1950s,¹ enabling us to systemically, and very effectively, erode planetary life support systems for short-term gains. We have entered the age of the human, also called the Anthropocene. The Anthropocene follows the relatively stable and predictable Holocene,² and is characterized by Earth system decay, possibly irreversible impacts on planetary integrity, increasing zoonotic diseases, intensified and differentially distributed vulnerabilities that characterize the uneven world order, and the rise of geopolitical conflicts.³ This is the *crisis of the Anthropocene*: "alarming climatic, ecological, and public health trends are unfolding with little evidence of abating [and] the convergence of these trends could lead to a comprehensive crisis where multiple risks materialize in reinforcing ways."⁴ The ongoing convergence of COVID-19, climate and Ukraine crises is indicative of this reality.

This paper aims to disentangle and critique the role of law, and specifically international environmental law (IEL), in creating the Anthropocene crisis, as well as IEL's inability, thus far, to effectively address this crisis or offer solutions that can meaningfully craft a sustainable and just future. With a view to informing possible legal reforms during Stockholm+50, and thereafter, this paper also looks ahead and asks how IEL can be reformed to initiate a long overdue global governance paradigm shift that can confront the deepening Anthropocene crisis. The argument unfolds in three parts.

Part one briefly offers context by exploring the notion of the Anthropocene. The discussion shows how the Anthropocene, to the extent that it evidences a rupture in Earth's geological history that inaugurates a new state of the Earth system that is rapidly becoming unable to support life,⁵ represents a new context for thinking about IEL and governance at a planetary scale. The aim is to elaborate how the Anthropocene necessitates a different type or form of IEL that is better suited to govern Promethean humans in this new geological epoch.

Part two interrogates some of the key failures of IEL. The discussion specifically focuses on: i) the inability of IEL to embrace an Earth system perspective and to respond to interconnected Earth system governance challenges; ii) the anthropocentrism of IEL that renders it unable to care for particularly vulnerable humans and a vulnerable non-human world, and that counterproductively facilitates environmentally destructive neoliberal economic development through its keystone principle of sustainable development; and iii) IEL's lack of ambition at a time when precisely such ambition is required.

Part three looks ahead and suggests possible reformative pathways for IEL. For this purpose, the discussion specifically focuses on the deficiencies identified in part two. As a response to IEL's inability to respond to interconnected Earth system governance challenges, the paper explores Earth system-oriented paradigms of law and governance that are based on Earth system science, and that could guide IEL's reorientation towards the *Earth system* as its principal regulatory object. The discussion focuses for this purpose on the recently introduced paradigm of Earth system law. The paper then explores alternative ecocentric-oriented approaches of seeing, being, and knowing that can replace the anthropocentric epistemologies of dominance, mastery, and exploitation that

IEL embraces.⁶ The emerging rights of this nature paradigm will serve as a foundation and focus of the discussion. Finally, the paper will reflect on ways IEL could raise its normative ambition.

Welcome to the Anthropocene:⁷ The New Governance Context for Law and Humanity

The term Anthropocene (*Anthropos* meaning “human” and *cene* meaning “new/recent”) was introduced in 2002 by Nobel Laureate Paul Crutzen.⁸ While the process formally denoting the Anthropocene as the new geological epoch is still underway,⁹ this term has become widely used in popular culture, scientific discourse, and policy debates.¹⁰ In addition to the more conventional scientific qualities that denote the Anthropocene as an “epochal manifestation of concrete socio- and bio-material conditions,”¹¹ the term has also become “a device for re-examining and discussing the role of humanity in the natural world, on timescales from the deep past to the far future, and on scales from the intimately reflective and personal to the planetary and geological.”¹²

The Anthropocene, and contemporary scientific insights that are developing around this trope, is shifting the focus away from localized human impacts on an externalized environment, to the Promethean ability of humans to destabilize the *entire* Earth system.¹³ The Earth system can be defined as:

... a single, planetary-level complex system, with a multitude of interacting biotic and abiotic components, [which has] evolved over 4.54 billion years and which has existed in well-defined, planetary-level states with transitions between them ... The Earth System is driven primarily by solar radiation and is influenced by other extrinsic factors, including changes in orbital parameters and occasional bolide strikes, as well as by its own internal dynamics in which the biosphere [which includes humans] is a critical component.¹⁴

As geological agents, humans are now seen to be part of the Earth system. The Anthropocene, therefore, suggests that “the environment” is not something out there, disconnected from humans and something we can “manage” and exploit for selfish short-term gain. The Anthropocene, with its interlinked cause-and effect relationships, instead foregrounds the idea of an interlinked Earth system of which humans are an integral part, where the Cartesian divide between humans and nature no longer exists:¹⁵

... the Anthropocene fundamentally challenges basic assumptions of modern thought, such as: dualisms separating humans from nature, conceptions of unique human agency and the presumption of progressive norms, such as liberty, [and] that the planet is capacious enough for individual acts to be thought of as disconnected from the peoples, species and processes once rendered as ‘others’.¹⁶

By situating humans in a coupled historical and Earth system context, the Anthropocene also powerfully communicates “a human *species*-responsibility to act in the face of a looming global climate crisis.”¹⁷ In doing so, it illuminates the overwhelming impacts of humans on Earth; expresses a sense of urgency to do something about planetary destruction; and signals that the relationship between the human and non-human world must change from one mired in human dominance,

exploitation, and subjugation to one where universally shared, but differentially distributed, vulnerability of all living beings are both recognized and responded to.¹⁸

There is mounting scientific evidence of this changing relationship, and the irreversible impacts that (some) humans have on planetary integrity.¹⁹ The United Nations Environment Programme (UNEP) was clear in its sixth *Global Environment Outlook* that human activities have “transformed the Earth’s natural systems, exceeding their capacity and disrupting their self-regulatory mechanisms, with irreversible consequences for global humanity.”²⁰ Earth system scientists believe that we have already crossed four of nine planetary boundaries,²¹ and that we are consequently moving outside of the “safe operating space” for life on Earth.²² We are also triggering Earth system tipping points where a small change “triggers a strongly nonlinear response in the internal dynamics of part of the climate system, qualitatively changing its future state.”²³ If triggered, these tipping points could result in massive cascading Earth system transformations. The Intergovernmental Panel on Climate Change’s (IPCC) *Sixth Assessment Report* states with “high confidence” that “[C]limate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater and coastal and open ocean marine ecosystems ... The extent and magnitude of climate change impacts are larger than estimated in previous assessments.”²⁴ And while some disagree,²⁵ several scientists now argue that we are already witnessing the start of a sixth mass extinction event that has been set in motion by human impacts on the Earth system.²⁶

What does law have to do with the extraordinary, and often irreversible, anthropogenic planetary decay that we are witnessing in the Anthropocene? Joshua Gellers argues in general terms that “the pronouncement of a new geological era has created the discursive space necessary for critically examining the law and imagining how it might be reconceived to address the complex problems caused by industrialization on the scale of the entire earth system.”²⁷ More specifically, our newly discovered geological human agency means that “Anthropocene thought acquires an ethical dimension - what global society *chooses to do* impacts the planetary environmental and ecological systems that must sustain later generations.”²⁸ It is precisely this ethical dimension that reveals the role of law in creating and addressing the Anthropocene crisis to the extent that law is a set of human norms that also reflects the ambitions and intentions of humans, and that capture, shape, and steer human choices. Alongside a range of other social regulatory institutions such as religion and economics, law has played, and continues to play, a central role in mediating the relationship between humans and nature. In its simplest form, law is a human artefact: a set of rules that humans create (most usually, but not always, through inclusive, representative democratic political processes) to order society, determine what type of behaviour is allowed, resolve conflicts, create opportunities, establish and protect rights and interests, and provide remedial measures in the case of non-compliance with these rules.

Within the broader realm of law, environmental law is a specialized set of legal rules that focuses on environmental protection, and IEL is a subset of rules that specifically provides for environmental protection at the international level. Even such a simplistic view of IEL points to its importance as a key part of global governance arrangements that must collectively allow, prohibit, and restrict human activities that impact the Earth system; provide for remedial measures where harm has occurred; offer alternative future pathways to coexist on a hostile and limited planet; and present the legal foundations to foster and enable the type of reimagined relationship between humans and nature alluded to above.

What does the Anthropocene tell us about the role that IEL has played and will play in mediating the relations between humans and other Earth system constituents? While others have extensively explored this question, this paper focuses on three overarching issues, which it briefly unpacks here, and that form the basis of the discussion in the rest of the paper.²⁹

The first is that the existing set of IEL has been crafted based on our collective human experience in the relatively stable and predictable Holocene epoch:

.. the definition of current international law [of which IEL is an integral part] is that of a system of rules resting on foundations that have evolved under the circumstances of the late Holocene, assumed to be everlasting. International law takes the conditions of the Holocene for granted, and, on that premise, a huge edifice of international law has been constructed. The change introduced in this underlying element of stability—and that is what the transition from the Holocene to the Anthropocene involves—contains the potential for an unprecedented type of tension in relations between States. The conditions of the Anthropocene will bring a fundamental shift in the context in which international law operates.³⁰

A critical concern is that IEL has not evolved in step with the continuously changing conditions that characterize the Anthropocene crisis. In other words, while the context in which IEL was conceived and operates has changed, IEL has not changed in tandem with the context. IEL instead remains stuck within the Holocene mindset, which is that of a world consisting of sovereign States that have absolute authority over everything and everyone in their territories; the right to exploit assumably unlimited human and non-human “resources” in the name of unrestricted neoliberal economic development; and despite clear scientific evidence to the contrary, that human impacts on Earth system stability are negligible and that planetary integrity will always remain intact. This mindset “misses a crucial point” as Mai and Boulot say:

It does not adequately recognize that interconnected social, technical and natural factors shape planetary processes. In other words, environmental law fails to acknowledge that it is not possible to conceive of, and address, ‘environmental’ issues without understanding them as problematic junctures of social, technical and natural dynamics.³¹

In terms of the current approach, we remain “on a mission to save the planet, one piece of environmental law or treaty at a time,”³² but this might not be enough, because the challenges that IEL needs to tackle have become both incredibly complex and enormously challenging.

One already observes, for example, the rise of geopolitical tensions and armed conflicts around the globe that are intertwined with environmental, climate, and energy insecurity. Russia’s invasion of Ukraine is forcing some countries to rethink their dependence on authoritarian regimes for their energy needs, which in some contexts is proving incompatible with humanitarian obligations and aspirations of global peace. This is occurring in tandem with new global sustainability initiatives such as the European Green Deal and other tentative efforts to decarbonize economies and redefine energy sovereignty.³³ IEL has not yet been able to formulate a realistically workable solution that can simultaneously facilitate decarbonization and promote global energy security without causing any trade-offs. Another example is disappearing low-lying small island States because of intensifying anthropogenic climate change and sea level rise, which is not only redrawing borders

and territories (and along with it, jurisdictions), but also leading to unprecedented displacement of people across continents.³⁴ IEL, and certainly international law more generally, struggles to confront this challenge of what to do about disappearing countries and forcefully displaced people, including the many conflicts that inevitably arise with migration.

Second, and related to the first consideration, we should assume that there will no longer be an “environment as we know it” to protect in the Anthropocene. The environment is already being altered in profound ways, as the scientific reports mentioned above show. Rakhyun Kim argues that:

... the environment itself is undergoing profound transformations, as the Earth System tends towards a new, less habitable, basin of attraction. The biosphere is not simply disappearing into the technosphere, but a new ‘environment’ is arriving, and this time, it will in all likelihood not be friendly to humans and many other forms of life. Modern environmentalism therefore has come to an end with the Anthropocene rupture in the sense that the environment no longer exists as an object for protection from humans.³⁵

Clive Hamilton likewise suggests that:

We can no longer withdraw and expect nature to return to any kind of ‘natural’ state. There is no going back to the Holocene. We may have acquired it foolishly, but we now have a responsibility for the Earth as a whole and pretending otherwise is itself irresponsible. So the question is not whether human beings stand at the center of the world, but what kind of human being stands at the center of the world, and what is the nature of that world.³⁶

With the Holocene environment rapidly transforming into an Anthropocene environment, the central objective of IEL will have to change from trying to incrementally ensure “environmental protection” and addressing negative externalities of transactions, to an objective that instead pursues planetary stewardship, addresses the underlying systematic conditions and drivers that cause negative externalities, and one that prioritizes planetary integrity and resilience. IEL will thus need to enable and continuously facilitate active planetary stewardship in order to maintain the planetary life support system, whereby “better”, kinder, and more responsible human beings will have to become humble planetary caretakers.³⁷

The third consideration is that IEL also contributes to the Anthropocene crisis and is unable to provide sustainable and just solutions for this crisis. As we shall see below, IEL primarily promotes human interests and not planetary integrity through its anthropocentric orientation and objectives, and this has contributed to the Anthropocene crisis by propelling humans to become powerful Promethean forces that can change the Earth system. Another consideration is that IEL is often complicit in actively promoting, or at least not sufficiently preventing, the structural drivers of the Anthropocene crisis. One example is our dependence on carbon and the deepening energy security crisis. Humans have mastered Earth’s ancient and finite carbon energy sources through the clever invention and deployment of technologies and associated neoliberal political, economic, and corporate institutions and processes.³⁸

These have been and are still regulated by “[S]pecific practices, institutions and imaginaries [that] have channelled the flow of hydrocarbons in particular directions, volumes and velocities,”³⁹ of

which IEL is an important part. Decarbonization seems to be a key element in the governance toolbox to address the climate crisis, but IEL has not yet managed to prioritize decarbonization in its rules and governance institutions, as the lacklustre commitments by States during all recent climate conferences of the parties (COPs) suggest. Clearly the lack of political will and neoliberal (corporate) economic interests are also to blame for the inertia of the world to embark on a rapid path of decarbonization, and a reason why we do not see much bolder legal and other commitments by States to pursue sustainable and ecologically responsible energy alternatives. But by not actively pushing the decarbonization agenda, IEL has played, and continues to play, a role in unlocking the potential of fossil fuels that form the foundation of contemporary society and its unsustainable global energy metabolism.

The foregoing suggests that IEL as a “technology of social organization”⁴⁰ has a lot of catching up to do and will have to orientate itself much more deliberately to the new context and deepening governance challenges of the Anthropocene’s converging crisis, if it wants to be successful in doing anything meaningful about this crisis.

Appraising International Environmental Law

IEL has made important contributions to advance environmental protection in the Holocene epoch. This is clear, for example, from the increasing maturity of its norms; its shift from prescriptive substantive-based norms to facilitative procedural implementation modes that foster greater transparency and participation by States and non-State parties; a greater deference to national capacities and reliance on flexible soft law norms; a shift from treaty-making to treaty interpretation and domestic implementation; increased judicialization and interventions by domestic and other courts to operationalize its norms; and its facilitation of increased decentralization and polycentric governance.⁴¹ These successes mostly seem to result from the interpretation and implementation actions of States and non-State actors at regional and domestic levels, which supports the general view that “the future of international law is domestic.”⁴² Anne-Marie Slaughter and William Burke-White argue that:

... the challenges facing States and the international community alike demand very different responses from and thus new roles for the international legal system. The processes of globalization and the emergence of new transnational threats have fundamentally changed the nature of governance and the necessary purposes of international law in the past few years. From cross-border pollution to terrorist training camps, from refugee flows to weapons proliferation, international problems have domestic roots that an interstate legal system is often powerless to address. To offer an effective response to these new challenges, the international legal system must be able to influence the domestic policies of States and harness national institutions in pursuit of global objectives. To create desirable conditions in the international system, from peace, to health to prosperity, international law must address the capacity and the will of domestic governments to respond to these issues at their sources.⁴³

This is already happening, and it is a positive sign for the future development of IEL and its influence on domestic and regional laws. Yet, despite these positive developments, it is also recognized that “there are clear constraints on what [IEL] can do, and can be expected to do, as it develops further. If [IEL] is to do more, it must move beyond the constraints of the current architecture and framing and

embrace a fundamental reconceptualization of existing models of governance, whether economic, political, social or legal.”⁴⁴ In what follows, this paper reflects on three constraints or challenges that are preventing a meaningful, and much needed, progression to a form of IEL that can govern Prometheans in the Anthropocene.

Protecting a Holocene Environment

We have already seen above that IEL follows a reductionist approach in its efforts to protect a Holocene environment. Such reductionism leads to a linear, one dimensional and segmented, understanding of what was incorrectly thought to be, discreet, unrelated, localized environmental problems that only occur in specific and disconnected geographic locations (e.g., vehicle emissions in Bangladesh is an air pollution problem in that city, and has no cascading effects on air quality and global warming elsewhere on the planet, which we now know is not the case). Laura Mai and Emille Boulot correctly point out that the current approach has tended to:

... prioritize command-and-control style interventions that favor front-end governance processes and purport to be able to predict and assess environmental harm, all in a balancing act with economic growth, national interests and social equity. In so doing, environmental law largely relies on State-centric, top-down, bureaucratic and efficiency-driven legal strategies which aim to produce goods and services in a predictable manner, while assuming that the environment is bounded and that environmental problems can be adequately conceived through linear cause-and-effect frameworks. Given these problematic starting points, environmental law exhibits inherent limitations that impede urgently needed, genuinely transformative change.⁴⁵

The “environmental” problems that IEL must address were seen as emerging in a Holocene context, which posed minimal challenges to top-down, unconnected, mostly State-driven, command-and-control regulatory institutions, which sought to tackle negative externalities of transactions instead of also addressing interrelated structural issues underlying human processes that impact an integrated Earth system:⁴⁶

... our present framework of environmental law is designed as if its subject matter is dictated by uniformitarianism rather than a set of dynamic, adaptive systems. Complex adaptive systems, because of their highly collectivized, nonlinear, dynamic behaviour, defy prediction through classical reductionist method ... Yet we have not designed our environmental law system with this underlying property in mind. Rather, it is mired in a reductionist, linear, predictivist mentality ignorant of underlying complex system behaviors.⁴⁷

The result is that the architecture of IEL, including its core assumptions, orientation, operation, and objectives, have become out of tune with the reality of the Anthropocene’s converging crisis and the multiple interlinked Earth system governance challenges emanating from this crisis.⁴⁸

As noted earlier, our new understanding of the Earth system and its complex interrelated processes, aspects, and constituents, requires urgent changes to governance approaches. The idea of the Earth system as an object of study was conceptualized by Earth system scientists “thinking about the history of our planet.”⁴⁹ It is only recently that the insights from Earth system science have found purchase in some social science domains like law and governance, with many

scholars converging around the idea of “Earth system governance” and its research agenda.⁵⁰ Earth system governance is defined as “the sum of the formal and informal rule systems and actor-networks at all levels of human society that are set up in order to influence the coevolution of human and natural systems.”⁵¹ It is an approach that confronts and seeks to solve the problem of misfit between the complexity of the Earth system on the one hand, and our currently fragmented regulatory systems on the other. Another framework that embraces an Earth system perspective is the planetary boundaries, already alluded to earlier. The planetary boundaries are coupled in a hierarchical network of interacting Earth system processes and serves as a concrete manifestation of a complex Earth system. Crossing one boundary may negatively affect other boundaries, and this impact may cascade and even become amplified.⁵²

Operating within the planetary context of the Anthropocene, and when compared to earlier forms of “environmental management”, these:

... more recent [system] perspectives emphasize instead the complete integration of human and non-human agency in complex socio-ecological systems, from local scales – such as forests or water bodies– up to regional scales, such as the Alpine region, and the entire earth system. A socio-ecological system perspective breaks down conceptual barriers between humans and their ‘surroundings’ and integrates them in a complex understanding where agency is diffuse, interactions are dynamic, and boundaries become blurred.⁵³

While the emergence of frameworks such as Earth system governance show that some sustainability scholars are starting to grasp the importance of Earth system-thinking, the same cannot be said for IEL and its stakeholders.⁵⁴ Practically speaking, the lack of appreciation for systems complexity in IEL can lead to the prioritization of one environmental problem over another, and it reinforces the creation of siloed regulatory regimes that may lead to problem shifting between planetary boundaries.⁵⁵ Conversely, if we do not integrate or better coordinate international environmental institutions in line with how planetary boundaries are interacting in a coupled Earth system, we run the risk of protecting one boundary at the cost of another. Examples of problem shifting include the case of increased ocean acidification using the ocean as carbon sinks and reservoirs, and the case of exacerbating climate change using certain substitutes with a high global warming potential for conventional ozone-depleting substances, or clearing forests to plant crops for biofuels.⁵⁶ A recent study highlights how IEL struggles to grapple with the coordination of planetary boundaries and the many complex planetary-scale governance challenges emanating from interacting planetary boundaries.⁵⁷

In sum, because IEL has not yet fully embraced an Earth system perspective, it remains unable to adequately respond to complex interrelated Earth system governance challenges, ecological dynamism, and the Earth system’s key characteristics such as its interconnectedness, unpredictability, instability, and complexity. Earth system scientists acknowledge that “the challenges to ... legal institutions to deal with the complexities of Earth System management are formidable.”⁵⁸ It is therefore logical and critically necessary that IEL urgently reorientates itself alongside an Earth system perspective in order to deal with this formidable challenge.

Anthropocentrism

Another concern is IEL's anthropocentrism that facilitates environmentally destructive and exploitative neoliberal economic development, which, in turn, causes massive global injustices between the Global North and the Global South (between and within countries), between species, and between present and future generations.⁵⁹ The Anthropocene crisis arose, in part, because of the prevailing anthropocentric worldview that permeates virtually all human systems; a worldview that places humans at the centre of Earthly existence. Anthropocentrism selectively promotes speciesism, and human exceptionalism, prominence, and privilege, and these are constructed, and continue to be maintained, through the law. Law, after all, is a *human* artefact, invented, designed, and shaped in order to selectively promote the interests of some humans.⁶⁰ Law is therefore by default anthropocentric, shutting out meaningful care for and protection of particularly vulnerable people (to the extent that its anthropocentrism also selectively privileges some humans over others), and the non-human world, unless such protection is seen as being beneficial to humans. As critical legal scholars argue: "when it comes to law's relationship with (and mediation of) the lifeworld of the planet and its non-human denizens, it is intensely problematic that the human subject stands at the centre of the juridical order as its only true agent and beneficiary."⁶¹

The anthropocentrism of law in general terms is also specifically clear from the provisions of IEL. This is problematic, considering that IEL is actually intended to protect the non-human world.⁶² Prudence Taylor says that IEL "has directly contributed to the environmental crisis. Because our laws reflect and affirm this [anthropocentric] environmental ethic, they have become part of the problem – international environmental law merely perpetuates the crisis and is reduced to a means of suppressing the symptoms."⁶³

The anthropocentric ethic of IEL is evident in numerous of its past and present provisions. The foundations of IEL's anthropocentric ethic were laid in the late 1800s and early 1900s with the adoption of the earliest IEL agreements created by States, such as the London Convention for the Protection of Wild Animals, Birds and Fish in Africa of 1900, and the Fur Seals Convention of 1911. These early environmental "conservation" instruments pursued narrow interests; the "dominant strain was utilitarian and anthropocentric,"⁶⁴ "their benefit, if any, for the environment was hardly more than a side effect."⁶⁵ These agreements were adopted to regulate the equitable and fair distribution and use of environmental "resources" among a small number of powerful European States for their common benefit. Therefore, the principal objectives of these agreements were to drive colonial exploitation and monetize and relegate the non-human world rather than to protect the environment.⁶⁶ As the saying goes: Brazilian gold left holes in Brazil, temples in Portugal, and factories in England.

Critical legal scholars argue that the anthropocentrism of IEL, especially in this early period, was highly effective in "othering" an externalized "nature" that is cherished only for its instrumental value to secure the survival of some humans in the global North: "[N]ature, in environmental law, is abstracted and reified from the social context, becoming passive, or non-agentic. Nature is therefore seen as terra nullius: a resource empty of meaning and purpose, available for annexation and exploitation."⁶⁷

IEL creates a range of "interrelated, virtually sacred binaries" such as man/nature, white/non-white, and man/woman.⁶⁸ These binaries and "othering" tendencies have already been firmly laid in one

of the foundational instruments of IEL, namely the 1972 Stockholm Declaration.⁶⁹ This declaration was pivotal in shaping IEL and its anthropocentric ethic⁷⁰ – it proclaimed the centrality of the human (and especially the male human subject). According to the preamble, *man* is a separate, but elevated, entity from his submissive environment that he creates and controls, that belongs to him, and that must sustain him:

Man is both creature and moulder of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth. ... Both aspects of man's environment, the natural and the man-made, are essential to his well-being and to the enjoyment of basic human rights [including] the right to life itself.

Not only do these provisions affirm human mastery over an environment that humans create and mould, it also places the environment in the service of the human, subjecting it to a mere support system exclusively in the service of the human subject.⁷¹ The Declaration continues by stating that: “[T]he protection and improvement of the human environment is a major issue which affects the well-being of peoples and economic development throughout the world,”⁷² it is not an issue that affects ecological integrity or environmental protection for the sake of it. It is rather the case, as the Stockholm Declaration says, that: “of all things in the world, people are the most precious.”⁷³

Following Stockholm in 1972, States continued down the human-centred neoliberal “environment *versus* development” path, first at the United Nations Conference on Environment and Development in 1992, and ten years later at the World Summit on Sustainable Development. With the blanket endorsement of the haloed idea of sustainable development, these conferences, many multilateral environmental agreements (MEAs), and grand development visions such as Our Common Future of 1987, the Millennium Development Goals, and now the Sustainable Development Goals (SDGs), have further promoted IEL's neoliberal, development-biased anthropocentrism.⁷⁴ This is problematic because sustainable development has become the dominant “framing of nature in global environmental governance”; it promotes human self-interest while there is a self-defeating assumption that “the increased use of these discourses of self-interest can promote better ways of living well with other species as well as ourselves.”⁷⁵

Sustainable development came of age in 1987, when the world acknowledged that it stood on the edge of an ecological precipice due to the “limits to growth.”⁷⁶ These initial motivations that generated the notion of sustainable development were positive in that its proponents sought to achieve social justice through development that is sustainable. They understood the increasing severity of the environment-development contradiction arising from the biophysical limits of endless growth, leading to multiple conflicts over dwindling natural resources and myriad injustices. However, numerous scholars now agree that sustainable development as it is currently understood is different from its original conception.⁷⁷ It has changed from being a “discourse of resistance, fusing radical environmental consciousness with a critical rethinking of a failed development enterprise” that focused on “scarcity and limits, affluence and poverty, global inequality, and the environmental viability of westernization,” to one that helps to legitimize the “grand universal project of neoliberal globalization.”⁷⁸

A central point of critique is that “sustainable development is an ecopolitical project which might be neither sustainable nor developmental ... [I]t is a palatable approach to ‘green-wrap’ the economic and political project of ‘sustainable degradation’ already now fully in play.”⁷⁹ There is a view that sustainable development has become an “improbable idea [that] is too rarely questioned,”⁸⁰ it

promises what it cannot deliver due to its central contradiction between economic growth and ecological sustainability, and the false promise that endless growth is actually possible on a finite planet where the human footprint is already far greater than Earth's ability to sustain life.⁸¹

This false promise cultivates, what Eduardo Gudynas⁸² describes as the delusion of infinite natural assets that the capitalist system has at its disposal to expand forever, while in fact the ambition of sustainable development is detached from the reality of ever-deepening socioecological destruction of a finite planet. The delusion of infinite natural assets that will always be available to sustain an ever-growing human population is evident from the way States use the principle of sustainable development in IEL, and development law and policy more generally, to argue that all that is needed is to strike a Brundtlandean *balance* between economic development, social development, and environmental protection.⁸³ The reality is that it will be impossible to strike any balance if one or more of these underlying pillars are eroded, as is currently the case with the social and environmental pillar. In short, it is not enough anymore, or even possible or appropriate, to simply try and “strike a balance.”

While there is little empirical evidence directly linking the reliance of States on the principle of sustainable development with ongoing global ecological degradation, it is clear that the use of this principle over decades, as the central cornerstone and objective of IEL and of the global development vision, has not contributed to safeguarding planetary integrity in any meaningful way. The scientific evidence cited earlier in this paper, and elsewhere, suggests otherwise.

More concrete evidence of the failures of sustainable development, as the world's central guiding development vision, is presented by a recent study that evaluated the political impact of the SDGs.⁸⁴ The SDGs are not legally binding but have some normative power and steering effects through their softer “governance through goals” approach,⁸⁵ and insofar as the SDGs are linked to the more formal steering effects of IEL.⁸⁶ One major finding of this study was that:

... owing to ontological and systemic factors, and limitations in their design and purpose, the available literature does not see the Sustainable Development Goals as having any significant potential to steer governance towards a prioritization of planetary integrity. Whatever indirect steering effects the Sustainable Development Goals might have in this respect are merely implied through the environmental goals at the bottom of the list of the Sustainable Development Goals.⁸⁷

In sum, sustainable development is not a socioecologically friendly concept and legal principle that can support the well-being of the living order in the Anthropocene epoch. Moulded as it is in the image of self-serving anthropocentrism, sustainable development has instead contributed to, and continues to exacerbate, the conditions that are responsible for creating the Anthropocene crisis.⁸⁸

Concerns About Normative Ambition

A final concern relating to IEL in the Anthropocene is its lack of normative ambition.⁸⁹ With few exceptions, the substantive norms of IEL, including those that shape its objectives, are not sufficiently ambitious to limit human behaviour in a way that could safeguard planetary integrity.⁹⁰ Admittedly, much of IEL's failures also have to do with a lack of implementation, lack of political will, and structurally vested neoliberal pro-growth corporate interests. Because law is also a result of

political processes, IEL often represents political compromises to ensure, as far as possible, that multiple political, societal, economic, and environmental interests are accommodated. IEL inevitably seems to chase the lowest common denominator that is shaped by political and economic interest and remains unable to achieve deep structural reforms because it is constrained in its efforts to develop the necessary ambition.⁹¹

This is obviously as much a matter of political will as it is a matter related to legal reform: IEL will only be reformed, and its ambition can consequently only increase, if there is the political will to do so. But as long as deeply vested political and economic (corporate) interests prevail, it is unlikely that IEL will increase its ambition. Going forward, a critical awareness of corporate socioecological destruction, and the complicity of the State in this endeavour,⁹² would be a crucial first step when considering how IEL could more ambitiously address such destruction: “the ongoing influence of TNCs [transnational corporations] and their interests in the operation of the world economy and the international legal order should now be of deep concern to anyone concerned about the poorer, disadvantaged inhabitants of our planet.”⁹³

For example, the climate planetary boundary is one of two “core” planetary boundaries, and it has already been crossed.⁹⁴ International climate law, because of its unambitious temperature targets that are not commensurate with the severity of the deepening climate crisis, is unable to do much about this crisis. The weak commitments by States under the Paris Agreement are projected to be wholly insufficient to hold the global average temperature increase to under 2 degree Celsius,⁹⁵ let alone limit the global temperature increase to 1.5 degree Celsius above pre-industrial levels.⁹⁶ Recent research suggests that there is a 40 per cent chance that the global average temperature will be 1.5 degree Celsius above pre-industrial levels in at least one of the next five years, “and the chance is increasing with time.”⁹⁷ In other words, the current *legal boundaries* of the international climate law regime are unable to ensure that the *climate change planetary boundary* is not transgressed, and the current targets will not set us on a path to protecting the integrity of the climate system.

Worryingly, the official non-binding and watered-down outcome of the United Nations Climate Change Conference held in Glasgow (COP26) – including a last minute decision to call for the “phase down” rather than “phase out” of unabated coal power in the Glasgow Climate Pact⁹⁸ – suggests that many States still do not seem to appreciate the need for adopting ambitious climate laws that are sufficient to effectively respond to the deepening climate crisis. This worrying trend is occurring, at least in part, and is reinforced substantially, by corporations (especially carbon majors) that have become highly influential actors in global climate politics and governance. The reality is that “the increasing risk of runaway global warming now pits capitalism against the climate, with fossil-fuel corporations and their allies on the front lines of a high-stakes struggle.”⁹⁹ Courts around the world have recently been stepping forward in an effort to, among others, expose this lack of normative ambition, forcing governments and corporations to take more urgent and drastic action to address the climate crisis.¹⁰⁰

Comprehensive structural reforms of IEL across the board are critically necessary. Regrettably, recent initiatives to reform IEL remain disappointingly unambitious and merely reinforce the *status quo ante* of IEL's path-dependent norms. For example, the French-led proposal for the adoption of a Global Pact for the Environment, on which considerable hopes have been pinned, has been criticized on several fronts for its lack of normative ambition and its inability to radically transform the

predatory neoliberal world order in which unrestrained economic growth continues without limits, regardless of planetary limits and widespread injustices.¹⁰¹ When it does happen, the creation of more ambitious IEL will likely be a gradual process that will lead to incremental change, rather than a once-off “global environmental constitutional moment” that radically transforms the IEL landscape in a short period of time; although admittedly, the severity of the Anthropocene crisis does demand faster action sooner instead of slower action later.¹⁰²

Three Proposals for Transforming International Environmental Law

The foregoing discussion endeavoured to show that the Anthropocene requires “new legal forms, practices and strategies ... that are attuned to the inherent mutuality of sociotechnical-ecological systems,”¹⁰³ and that are actually able to respond to the crisis of the Anthropocene. Building on this critique, the paper now explores three interrelated proposals to reform IEL.

Earth System Law

For IEL to be able to better respond to integrated Earth system governance challenges, it must embrace an Earth system perspective. Scholars have been exploring alternative Earth system-oriented visions for IEL.¹⁰⁴ While terms such as “Earth-centred law”¹⁰⁵ and “planetary boundaries law”¹⁰⁶ have been suggested, the growing epistemic project of Earth system law holds out considerable potential to reimagine and craft “next-generation international environmental law”¹⁰⁷ for the Anthropocene, or *Lex Anthropocenae*.¹⁰⁸

The concept of Earth system law was first proposed in 2019;¹⁰⁹ an endeavour that Biermann describes as an “attempt to chart a new legal field.”¹¹⁰ Although the discourse on Earth system law is not yet mature, interest in this proposal is growing, as the emerging scholarship shows.¹¹¹ In essence, the project of Earth system law offers an alternative framing for IEL to facilitate the type of transformations and governance interventions that are in step with a continuously transforming Earth system, and that are required to address the Anthropocene crisis. Earth system law is a “new legal paradigm that seeks to correct for socioecological injustices by disrupting foundational assumptions of conventional law. Such a substantial reorganization requires that law shed its reactive and individualist tendencies in favour of the principles of inclusivity, interdependencies, and complexity,”¹¹² notably in the context of a complex Earth system.

Earth system law is defined as an innovative legal framing rooted in the Anthropocene’s planetary context and its perceived crisis. Earth system law is aligned with, and responsive to, the Earth system’s functional, spatial and temporal complexities; and the multiple Earth system science and social science-based governance challenges arising from the unstable state in which the Earth system operates. Earth system law seeks to respond to the Earth system’s instability and unpredictability and its governance challenges through a continuous norm development process that drives meaningful transformations as well as intra-, inter-, and trans-disciplinary learning and deliberation. To this end, and in pursuit of desirable planetary futures, Earth system law offers an analytical framework to better understand and respond to the legal dimensions of Earth system governance; the normative foundations to govern the full spectrum of Earth system relationships in a way that promotes planetary integrity and justice; and the legal means to facilitate transformative Earth system governance for long-term sustainability.¹¹³

Earth system law is not a new body of law, such as human rights law or trade law that focus on specific issues. It rather offers a new paradigm that introduces the Earth system perspective into the legal domain, and that urges lawyers to think about law generally, and IEL in particular, in Earth system terms: “this new vision for law is Earth-centred and acknowledges that everything is bound together in a social-ecological system dominated by humans.”¹¹⁴ Others elaborate that:

The earth system law framework advances here a novel systems approach to law; an approach that merges the systemic and complex nature of the earth system and of the legal system into a single operative framework. In doing so, the framework allows the epistemic traveller to explore responses to earth system-related regulatory implications of the Anthropocene such as complexity, inclusivity, interdependencies, and the need for radical transformations in the face of unprecedented social-ecological injustices at a planetary scale.¹¹⁵

In addition to this more abstract utility of Earth system law, this new legal paradigm also encourages IEL stakeholders to grapple more deliberately with the natural science aspects of the Earth system, and to translate these into the social science domain in a way that also meaningfully embraces “Earth system governmentality.”¹¹⁶ Relying on Earth system science creates an opportunity for lawmakers, first, to understand the nature and extent of the problem that IEL needs to address, which then enables them to fashion any legal reforms alongside what the science suggests will be necessary to solve the problem. Earth system law therefore requires scholars, and law and policymakers, to consciously embrace Earth system science as a tool to shape new legal norms. In other words, Earth system law builds bridges between the natural science domain of Earth system science that tries to understand the Earth system, and the domain of social science that explores how to respond to Earth system transformations through human norms.

Another related benefit of Earth system law is the opportunity it presents to open up conversations about law reform to a much broader audience, and to usefully draw on the expertise of disciplines that lie outside the legal domain. While IEL has traditionally been a mono-disciplinary endeavour, Earth system law urges those who research, design, interpret and apply legal norms, to actively engage in intra-, inter-, and trans-disciplinary conversations, learning, and processes of knowledge creation to better understand Earth system transformations, and the numerous legal and other ways to respond to these transformations. In doing so it allows “lawyers and non-lawyers to transcend disciplinary boundaries and rethink the production of knowledge across fields in order to attempt solving deeply intertwined Earth system governance challenges by drawing on a rich variety of knowledges.”¹¹⁷ Going forward, it is precisely such a diverse and all-embracing approach that is more open to a range of legal and non-legal insights from a broad range of disciplines and social actors (including, for example, activist movements, indigenous communities, and scientific communities), that the architects of IEL will have to follow in order to craft a form of IEL that can confront complex integrated Earth system governance challenges. The Talanoa Dialogue Platform – that aimed to facilitate cross-sectoral, multi-stakeholder dialogues during previous climate COPs – is a useful example of what is possible in this respect, and it could serve as a blueprint for future endeavours focused on harvesting insights and knowledge to shape IEL.¹¹⁸

There are also other ways in which an Earth system-oriented legal paradigm could practically assist in reforming IEL. One is to better understand and respond to the persistent concern of fragmentation of IEL and its institutional framework. Because it was designed in the context of a Holocene understanding that is based on discreet and unrelated environmental problems,

IEL consists of “issue-specific treaty regimes, international administrative agencies with narrow mandates, and insular negotiation processes [that] hinder efforts to account for, and respond to, dependencies between interconnected elements of the Earth System.”¹¹⁹ It is a deeply fragmented regime complex with conflicting provisions that overlap and contradict, and it contains numerous regulatory gaps while lacking comprehensive and consolidated enforcement measures that could address Earth system degradation in a holistic way.¹²⁰ Scholars agree that while fragmentation can “promote diversity in approaches, experimentation, and flexibility,” it also gives rise to “uncertainty, confusion, and the entrenchment of power imbalances.”¹²¹ Moreover, as was already shown earlier, fragmentation could lead to problem shifting and prioritizing one regime, such as biodiversity, over another. Drawing on the notion of the Earth system as an integrated entity that is associated with integrated Earth system governance challenges, Earth system law makes a strong case for integration and could act as a map to identify and address fragmentation of the global environmental governance regime.

Ecologizing International Environmental Law

It was already pointed out above that the Anthropocene crisis is also a crisis of ethics:

The Anthropocene is both a state of nature and a state of mind. Anthropocene thought has an intergenerational rhythm; what each generation thinks sets the stage for what the next generation does, and what that generation does shapes the planet its children will live on as well as the society its children will live in. In the Anthropocene, what we think as a planet is what our grandchildren get as a planet ... What we did unthinkingly in the past two generations we could undo in the next two ... we must decide together what kind of society we want to live in and what kind of planet we want to live on.¹²²

We would need to adopt a new planetary ethic going forward,¹²³ and IEL will, among other social regulatory institutions, have to embrace and give voice to this ethic. The process of developing and adopting a new planetary ethic is preconditioned upon the need for being open to alternative ways of seeing, being, and knowing that produce epistemologies of care and humility instead of anthropocentric epistemologies of dominance and mastery such as those associated with sustainable development.¹²⁴

Epistemologies of care and humility are predicated upon a “relational sense of solidarity that recognizes that the subjugation and suffering of one is in fact indicative of the oppression of all.”¹²⁵ One already observes the emergence of alternative, ecologically sustainable ways of seeing, being, knowing, and caring that offer opportunities to appreciate how “worlds are known and enacted, so as to more ethically and effectively navigate contemporary socioecological challenges facing the planet and the human-nonhuman relations upon which its health depends,” while at once enabling a critical interrogation of “questions of power and the ways that dominant discourses, practices, and institutions [such as sustainable development] shape the worlds in which people live.”¹²⁶ These alternatives can replace, and are already gradually replacing in some legal systems, the hubristic epistemologies of exploitation and mastery that have brought us to the precipice.

An example is the idea of *buen vivir* (living well) that forms the basis for the evolution of rights of nature in several Latin American countries. As a central idea in Andean cosmovisions, *buen vivir* promotes an alternative to neoliberal sustainable development; a concept that is alien to Andean

cosmovisions, conceptual categories, and languages of indigenous communities.¹²⁷ *Buen vivir* instead is a biocentric counterweight to anthropocentrism in which *Pachamama* (Mother Earth) is understood as an ever-present deity who is the source and sustainer of all life, of which humans are only a small part. *Buen vivir* offers alternative forms of law and governance to protect *Pachamama* that reject the Cartesian society-nature dualism. Gudynas writes that *buen vivir* “moves away from the prevalence of instrumental and manipulative rationality. It rejects the modern stance that almost everything should be dominated and controlled, including people and nature, so that they become means to exploitative ends.”¹²⁸ In this sense, *buen vivir* “assumes a relationship of belonging rather than domination or exploitation.”¹²⁹

Buen vivir also eschews the notion that human beings are at the centre of all concern and the only source of values, and it shuns modernity’s obsessions with growth and progress because it does not conceive a beginning or end in time in the way that visions of progress and development from point a to b do in the context of European modernity. This means that “there can be no ‘development’ insofar as there is no preliminary situation of underdevelopment.”¹³⁰ Well-being is possible only within a community understood in an expansive sense that also includes non-humans. Compared to gross domestic product (GDP) – sustainable development’s key measure of well-being – *buen vivir* instead involves a broader, more inclusive notion of well-being and cohabitation with the non-human world, which it views as an essential, constitutive element of social life with intrinsic value. Well-being flows from communal life in harmony with nature and it is consistent with principles of reciprocity, complementarity, and relationality. In this sense, well-being is related to a “life in fullness”, which means “a life of material and spiritual excellence expressed harmoniously and in relation to all beings, as well as a community’s internal and external equilibrium.”¹³¹

Buen vivir exercises a growing influence on Latin American jurisprudence through its incorporation in the national development plans, and constitutional and statutory provisions in Bolivia, Ecuador, and Colombia.¹³² Unfortunately, this alterative worldview, including the rights of nature paradigm, has not yet managed to infiltrate international law in any meaningful way. The only example of an ecocentric-oriented instrument in the domain of IEL is the World Charter for Nature, which was adopted with a majority vote by the United Nations General Assembly in 1982. Although it is an example of the softest of soft law instruments that IEL has to offer,¹³³ the Charter recognizes that “[hu]mankind is a part of nature and life depends on the uninterrupted functioning of natural systems”, and that “[e]very form of life is unique, warranting respect regardless of its worth to [humans].”

The World Charter for Nature has been described as an “avowedly ecological instrument, which emphasizes the protection of nature as an end in itself.”¹³⁴ Such formulations that recognize the value of nature as an end in itself, irrespective of its value to humans, are the type of legal language that could reflect a new ethics of care in IEL. The World Charter for Nature could serve as a blueprint for the negotiation of an ecologically oriented framework MEA that has, at its core, the objective to pursue ecological sustainability and respect for planetary integrity, instead of destructive neoliberal economic development that exploits a vulnerable human and non-human world. Assuming that the adoption of an overarching framework MEA is unlikely to happen soon, and that IEL reforms will likely be more incremental, the World Charter could also serve as an example of the type of provisions that future versions of treaties such as the Convention on Biological Diversity of 1992 and the Paris Agreement of 2015 could adopt. In fact, the Convention on Biological Diversity already recognizes, albeit in its preambular provisions, the “intrinsic value of biological diversity”

and “the importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere.” While such ecocentric-oriented provisions will also have to be included in the operative parts of treaties in order to ensure implementation. Insufficient as it might still be in the larger scheme of things, this is a positive trend that should be expanded in future efforts to reform IEL.

Earth system law could also play an innovative role in IEL’s search for a new planetary ethic. Laura Mai and Emille Boulot say that Earth system law must “find ways to expand the ontological categories which to date have carried legal thought and practice. The challenge is to introduce, and make accessible new, unfamiliar and perhaps counter-intuitive notions of participating in, and experiencing, sociotechnical-ecological systems.”¹³⁵ Joshua Gellers rises to this challenge and uses Earth system law to argue in support of extending legal subjectivity to non-humans, and even artefactual non-humans such as robots.¹³⁶ Gellers’ suggestion is a response to concerns that the current IEL paradigm understands private property, State sovereignty, and corporate rights to trump planetary integrity, while “prevailing legal narratives of the physical world fail to acknowledge the life-enabling properties of the Earth.”¹³⁷

Such an acknowledgment will require an extension of legal subjectivity to non-humans, which is theoretically possible in terms of the Earth system law framework to the extent that Earth system law’s principal referent is a complexly intertwined Earth system. The Earth system consists of a “physical world” (i.e., the geosphere, hydrosphere, cryosphere, and atmosphere), the “biological world” (i.e., the biosphere), and the “mental world” (i.e., the technosphere). The three intertwined worlds of Earth system law’s are much broader and inclusive than IEL’s “environment”, and they potentially open up the “closed” anthropocentric legal subjectivity of IEL to a much larger range of legal subjects that deserve protection in their own right, and not only because they have some instrumental value for IEL’s traditional human subject.

Creating Ambitious International Environmental Law

IEL will have to raise its level of ambition if it is to stay relevant in the Anthropocene epoch. How could this be achieved? Rakhyun Kim believes that IEL must clarify what its ultimate, overarching goal is.¹³⁸ The future shape and content of IEL will depend on this goal; the more ambitious the goal is, the more ambitious the provisions of IEL will have to be to achieve this goal. In the context of the Anthropocene crisis, it is suggested that “[t]he ultimate purpose of international environmental law should clearly be maintaining and restoring the integrity of Earth’s life-support system as a precondition for sustainable development.”¹³⁹ In other words, IEL’s goal in the Anthropocene must change from achieving sustainable development by protecting a Holocene environment, to safeguarding, and even restoring where possible, the integrity of the Earth system, or planetary integrity.

The notion of planetary integrity derives from its root term “ecological integrity”, which describes the declining state of biodiversity on a subglobal scale.¹⁴⁰ In this context, integrity is a way of thinking about ecological health affected by human activities.¹⁴¹ The notion of integrity already occurs in some IEL instruments, which suggests that it is tentatively entering the more formal domain of IEL. This could potentially make the adoption of planetary integrity as IEL’s new goal (either through treaties separately, or by means of a soft law declaration or framework MEA) more palatable and easier in future. One example is the Convention for the Conservation of Antarctic Marine Living

Resources of 1980, which affirms in its preamble “the importance of safeguarding the environment and protecting the integrity of the ecosystem of the seas surrounding Antarctica.”

Not only could the formulation of a common goal help to address the problem of fragmentation alluded to earlier (in the sense that working towards a common goal will require cooperation within and between disparate treaty regimes), it could also help to raise IEL’s ambition by replacing neoliberal sustainable development with a radically different conception of what it is that IEL should strive for.

In addition, the degree of heightened ambition that any new form of IEL for the Anthropocene should ideally strive for must also be guided by what Earth system science, and other forms of knowledge such as indigenous knowledge systems, tell us about the state of Earth system decay. One option that has been extensively explored in a recent study is that the future development of IEL should be guided by the planetary boundaries framework.¹⁴² This enables a process whereby Earth system science can shape IEL, and where IEL can be more responsive to state-of-the-art science, while meaningfully translating the planetary boundaries determined by science into legal boundaries:

... effective environmental legislation must at a minimum act as legal boundaries that prevent human activities from reaching and breaching planetary boundaries, defined as the safe space for mankind to operate within ... In other words, legal boundaries must translate the physical reality of a finite world into law and thereby delimit acceptable levels of human activity.¹⁴³

Such an approach that better facilitates the dialectical relationship between law, science, and other knowledge domains could eventually result in the creation of a form of IEL that is undergirded and fully shaped by processes of dynamic knowledge creation; a process which could, in turn, be guided by the Earth system law framework discussed above. Relying more extensively on science will allow the architects of IEL to ensure that IEL can be designed, interpreted, and applied in accordance with the latest understanding of the state of the Earth system. It will also enable us to identify regulatory gaps where specific Earth system governance concerns are not yet legally regulated, such as underground transboundary water governance, global plastics pollution, or the governance of solar geoengineering, and to create the proper instruments to do so.¹⁴⁴ Linking the political and lawmaking processes of IEL with state-of-the-art science, could, for example, be practically facilitated by involving scientists, and other social actors, more deliberately in the processes of COPs and elsewhere.

Conclusion

In 2002, Paul Crutzen prophetically proclaimed:

Unless there is a global catastrophe — a meteorite impact, a world war or a pandemic — mankind will remain a major environmental force for many millennia. A daunting task lies ahead for scientists and engineers to guide society towards environmentally sustainable management during the era of the Anthropocene. This will require appropriate human behaviour at all scales.¹⁴⁵

Just as we are (possibly?) emerging from one of the worst pandemics in decades, we are entering a new era of intense geopolitical conflict where the possibility of a third world war is more real than it has been for decades. The Anthropocene's crisis might just still very well be "solved" by entirely erasing humans from the face of Earth, or substantially diminishing humanity's geological powers.

Yet, a less fatalistic, and certainly more optimistic approach to ensuring planetary integrity, would be to take up the "daunting task" to try and ensure "appropriate human behaviour at all scales." IEL can never be a panacea for fully addressing on its own the complex task of governing the Earth system, but it will always have a critically important role to play in this existential endeavour, because it remains one of the most effective tools of social organization that we have at our disposal to ensure humans behave appropriately as part of a much larger, but increasingly fragile, Earth system.

Humans have successfully been using law for centuries to serve our inappropriate short-term interests and material well-being and needs. Legally sanctioned practices of slavery, colonialism, extractivism, and corporate exploitation are only some of many examples in this respect. So, the inability of law, and in particular IEL, to deal with the Anthropocene's crisis is not because law itself is an ineffective instrument, but because we have not been using it correctly. We need to reimagine IEL within a planetary context for the purpose of IEL becoming better suited for the altogether new Earth system governance context of the Anthropocene, for IEL to decentre the human, and for IEL to become much more ambitious in the face of rapidly declining planetary integrity.



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