

EDITORIAL

The Complexity of Transnational Environmental Law

1. Introduction

Complexity has long been a key theme in transnational environmental law scholarship. The very origins of our field lie in the recognition that contemporary environmental legal problems and solutions typically involve an intricate array of public and private actors and institutions; span multiple jurisdictions, regimes, and scales of governance; and interact with broader socio-legal processes and systems.¹ Scholars have had to go beyond traditional approaches to legal analysis and draw on innovative and interdisciplinary theories and methods to understand the nature, potential, and limitations of transnational legal phenomena in the field of environmental law.²

The articles contained in this issue of *Transnational Environmental Law* (TEL) illustrate the various causes and manifestations of the complexity inherent in this field and discipline. To do so, they use a breadth of perspectives and methodologies that reflect the diversity that is characteristic of TEL as an intellectual community. We have divided these articles into three thematic sets. The first set of articles reflects the convoluted nature of two different types of environmental problem and how they complicate transnational legal problem solving. The next three contributions highlight the daunting task of governing new technologies and markets that inevitably raise a host of ethical and scientific controversies. The final set of contributions focuses on the challenges of securing voluntary compliance with environmental legal norms in a context where effective enforcement mechanisms are lacking.

2. The Complexity of Transnational Environmental Problems

The complexity of transnational environmental law stems, first and foremost, from the intricate and multifaceted global environmental problems it is meant to address. Because their diverse and diffuse causes, manifestations, and impacts extend across multiple scales, these problems require transnational legal norms, practices, and processes that engage multiple domestic, regional, and international legal institutions and systems.³

¹ See, e.g., V. Heyvaert & T.F.M. Etty, 'Introducing Transnational Environmental Law' (2012) 1(1) *Transnational Environmental Law*, pp. 1–11; V. Heyvaert, 'The Transnationalization of Law: Rethinking Law through Transnational Environmental Regulation' (2017) 6(2) *Transnational Environmental Law*, pp. 205–36; V. Heyvaert & L.-A. Duvic-Paoli, 'The Meanings of Transnational Environmental Law', in V. Heyvaert & L.-A. Duvic-Paoli (eds), *Research Handbook on Transnational Environmental Law* (Edward Elgar, 2020), pp. 1–17.

² E. Morgera, L. Parks & M. Schroeder, 'Methodological Challenges of Transnational Environmental Law', in Heyvaert & Duvic-Paoli, *ibid.*, pp. 48–65.

³ K. Kulovesi, M. Mehling & E. Morgera, 'Global Environmental Law: Context and Theory, Challenge and Promise' (2019) 8(3) *Transnational Environmental Law*, pp. 405–35; J. Peel, L. Godden &

This classic type of transnational environmental problem is perfectly captured in Valentin Schatz's article 'Assessing Drifting Fish Aggregating Device (dFAD) Abandonment under International Marine Pollution Law'.⁴ Schatz discusses the issue of marine litter, particularly plastic pollution caused by abandoned, lost, and discarded fishing gear (ALDFG), such as drifting fish aggregating devices (dFADs). These dFADs, widely used by industrial purse seine tuna fleets, are a significant source of ocean pollution, engendering the entanglement of marine wildlife, the perturbation of their habitat, and the spread of microplastic. Schatz offers an in-depth examination of whether the deliberate abandonment of dFADs is illegal under international marine pollution law. His analysis highlights the complex task of interpreting and applying legal norms that originate from the fragmented legal regime applicable to different aspects of marine pollution, consisting of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention),⁵ its 1996 Protocol (London Protocol),⁶ and the International Convention for the Prevention of Pollution from Ships (MARPOL).⁷ Schatz concludes that the deliberate abandonment of dFADs is unlawful under international law and that states accordingly are 'obliged to prescribe and enforce domestic laws and regulations to ensure compliance with these international prohibitions by private actors under their jurisdiction'.⁸ As such, his article illustrates well how the challenge of addressing a complex multi-scalar problem that involves public and private actors and multiple legal regimes requires an equally complex transnational legal response.

Transnational environmental problems can also be especially difficult to address because they are embedded in a set of path-dependent social, political, and economic structures. In his article 'Law, Colonial-Capitalist Floods, and the Production of Injustices in Eastern India: Insights for Climate Adaptation',⁹ Birsha Ohdedar explores the structural dimensions of the destructive floods that regularly recur in the Damodar river valley in Eastern India. Drawing on political ecology and environmental history, he argues that the destructive impacts of floods are not merely 'natural' disasters; they result from 'political and economic decisions around the use, allocation, and management of water'.¹⁰ Ohdedar conceives of this complex interdependence between water and society as a 'hydro-social cycle' that is shaped by colonial legacies, power asymmetries, capitalism, and systems of governance. He highlights the role of law in

R.J. Keenan, 'Climate Change Law in an Era of Multi-Level Governance' (2012) 1(2) *Transnational Environmental Law*, pp. 245–80.

⁴ V. Schatz, 'Assessing Drifting Fish Aggregating Device (dFAD) Abandonment under International Marine Pollution Law' (2024) 13(2) *Transnational Environmental Law*, pp. 243–63.

⁵ London (United Kingdom (UK)), 29 Dec. 1972, in force 30 Aug. 1975, available at: <https://www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx>.

⁶ London (UK), 7 Nov. 1996, in force 24 Mar. 2006, available at: <https://www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx>.

⁷ London (UK), 2 Nov. 1973, in force 2 Oct. 1983, available at: [https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx).

⁸ Schatz, n. 4 above, p. 261.

⁹ B. Ohdedar, 'Law, Colonial-Capitalist Floods, and the Production of Injustices in Eastern India: Insights for Climate Adaptation' (2024) 13(2) *Transnational Environmental Law*, pp. 264–85.

¹⁰ *Ibid.*, p. 282.

producing and sustaining environmental injustices and contributing to the uneven impacts of floods for local communities. This structural understanding of flooding as a problem suggests that incremental adaptation measures are unlikely to yield meaningful changes in the outcomes of floods in Eastern India. Ohdedar emphasizes the need for transformative approaches, which can tackle and disrupt the underlying structures that produce the injustices associated with floods.

Law is implicated in the reproduction of multiple types of structural inequality, including those that shape the relationships between humans and other species on the planet. Yet, as the example of many Indigenous legal traditions evinces, law can also serve as a resource for disrupting and transforming the structures that marginalize the more-than-human world.¹¹ Numerous scholars have proposed granting rights to nature as one way of protecting natural entities from human exploitation.¹² In their article ‘A New Leaf: Is It Time to De-objectify Plants in Private Law?’,¹³ Joris van Laarhoven and Rens Claerhout focus on the role of private law in reinforcing or challenging anthropocentric understandings of plants as objects. Whereas legal systems have typically adopted a narrow instrumental conception of plants, Van Laarhoven and Claerhout review recent advances in plant biology suggesting that plants are sentient. Rather than advocate that plants be granted legal personhood and rights, they contend that private law should recognize plants as living beings and grant them the same de-objectified status that has been accorded to animals in many civil law jurisdictions. This novel proposal reflects the complex role of transnational environmental law in blurring entrenched legal categories, such as the distinction between subjects and objects, animals and plants, and public and private law.

3. Governing Markets and Technologies

The rapid pace of technological advancement has been a key challenge for environmental law and governance since the Industrial Revolution. New technologies and industries frequently have unintended large-scale environmental effects, such as air and water pollution generated by factories, electronic waste from obsolete gadgets or, most recently, the carbon footprint of emerging technologies like artificial intelligence (AI) or cryptocurrencies. Working within a market-based approach to environmental problem solving, governments have developed mechanisms to ensure that companies internalize the environmental externalities of their activities.¹⁴ Governments have also sought to incentivize and catalyze the development and adoption of low-carbon

¹¹ M. Deckha, ‘Unsettling Anthropocentric Legal Systems: Reconciliation, Indigenous Laws, and Animal Personhood’ (2020) 41(1) *Journal of Intercultural Studies*, pp. 77–97.

¹² C.M. Kauffman & P.L. Martin, *The Politics of Rights of Nature: Strategies for Building a More Sustainable Future* (The MIT Press, 2021).

¹³ J. van Laarhoven & R. Claerhout, ‘A New Leaf: Is It Time to De-objectify Plants in Private Law?’ (2024) 13(2) *Transnational Environmental Law*, pp. 286–311.

¹⁴ J. Penca, ‘Marketing the Market: The Ideology of Market Mechanisms for Biodiversity Conservation’ (2013) 2(2) *Transnational Environmental Law*, pp. 235–57.

technologies and practices, often as part of a broader green economic agenda.¹⁵ These initiatives have tended to be invested with multiple environmental, social, and economic objectives, and have generated significant controversy among stakeholders with diverging agendas and priorities.¹⁶ Even technologies and markets that are developed or proposed as solutions to environmental problems can also become entangled with broader discursive struggles that concern the role of markets and technologies in society, conceptions of environmental justice, or the relationship between humans and nature.¹⁷ As the next three articles illustrate, the task of effectively and equitably regulating climate-related markets and technologies is further compounded by the urgent need to reduce carbon emissions in the light of the mounting and escalating impacts of the climate crisis.

In their article ‘The Legal Objectives of the EU Emissions Trading System: An Evaluation Framework’,¹⁸ Manolis Kotzampasakis and Edwin Woerdman propose a new approach for evaluating the performance of the European Union Emissions Trading System (EU ETS). There is extensive literature assessing how the EU ETS has functioned as a carbon market, which has typically focused on key environmental and economic criteria such as overall reductions in greenhouse gas (GHG) emissions and the costs of climate mitigation.¹⁹ Because of the multiplicity of the goals of the ETS and the many different ways in which it may affect markets, society, and the environment, scholars remain divided over selecting a normative approach that could be adopted to assess its impacts. To resolve this impasse, Kotzampasakis and Woerdman set out an assessment framework that is specifically based on a rigorous analysis and interpretation of the legal objectives of the ETS – a methodology they characterize as a ‘law first’.²⁰ By combining their legal analysis with an economic understanding of how the ETS is intended to operate as a market instrument, the authors formulate a set of evaluation criteria that reflects the objectives and sub-objectives of the ETS. Their nuanced proposal highlights the multifaceted normative dimensions of transnational environmental law and the challenges posed by the heterogeneity of normative frameworks found in laws and scholarship.

The contribution by Xiaohan Gong, Rainer Quitzow and Anatole Boute grapples with a different kind of heterogeneity which is commonplace in transnational environmental law: the multiplicity of levels of authority in a system of governance.

¹⁵ D. Eaton, ‘Technology and Innovation for a Green Economy’ (2013) 22(1) *Review of European, Comparative & International Environmental Law*, pp. 62–7.

¹⁶ Penca, n. 14 above, pp. 253–6.

¹⁷ S. Jodoin, ‘Transnational Legal Process and Discourse in Environmental Governance: The Case of REDD+ in Tanzania’ (2019) 44(4) *Law and Social Inquiry*, pp. 1019–50.

¹⁸ M. Kotzampasakis & E. Woerdman, ‘The Legal Objectives of the EU Emissions Trading System: An Evaluation Framework’ (2024) 13(2) *Transnational Environmental Law*, pp. 312–36.

¹⁹ See, e.g., P. Konidari & D. Mavrakis, ‘A Multi-Criteria Evaluation Method for Climate Change Mitigation Policy Instruments’ (2007) 35(12) *Energy Policy*, pp. 6235–57; M.G. Pollitt & G.G. Dolphin, ‘Should the EU ETS be Extended to Road Transport and Heating Fuels?’ (2022) 11(1) *Economics of Energy and Environmental Policy*, pp. 1–20; P. Bayer & M. Aklin, ‘The European Union Emissions Trading System Reduced CO₂ Emissions Despite Low Prices’ (2020) 117(16) *PNAS*, pp. 8804–12.

²⁰ Kotzampasakis & Woerdman, n. 18 above, p. 316.

Their article, ‘Developing China’s Hydrogen Economy: National Regulation Through Local Experimentation’,²¹ offers a case study of China’s multi-level regulatory approach to promoting hydrogen technologies, particularly hydrogen refuelling stations and fuel cell vehicles. Because the deployment of hydrogen comes with its share of economic and environmental risks, its potential role in the decarbonization of energy production and consumption remains reliant on government support and regulations.²² The authors explain that local governments in China have played a critical role in developing innovative policies to support the hydrogen industry in the absence of significant regulatory action at the central level. They argue that this regulatory experimentation has helped to mitigate the uncertainties associated with the deployment of hydrogen and generated lessons that can help in shaping future national hydrogen regulations. Yet, this purely decentralized approach has generated some inefficiencies as it has led to regulatory fragmentation and protectionist policies. Gong, Quitzow and Boute thus conclude that a harmonized regime developed at the national level will eventually be necessary ‘to address the obstacles that localization requirements and the local subsidy race pose to the development of hydrogen’ as well as ‘to reduce transaction costs for investors, and generate economies of scale and learning effects’.²³

Finally, in their article ‘Towards a Non-Use Regime on Solar Geoengineering: Lessons from International Law and Governance’,²⁴ Aarti Gupta, Frank Biermann, Ellinore van Driel, Nadia Bernaz, Dhanasree Jayaram, Rakhyun Kim, Louis Kotzé, Dana Ruddigkeit, Stacy VanDeveer and Margaretha Wewerinke-Singh come together to grapple with one of the most controversial ideas in the field of climate governance: solar radiation modification (SRM). SRM is a form of climate geoengineering that aims to reflect a small portion of sunlight and heat back into space to reduce global warming and cool the Earth’s surface.²⁵ Because of its potential health and environmental impacts, the possibility that it might delay efforts to reduce GHG emissions, and its underlying normative assumptions, SRM has elicited significant opposition from civil society organizations, scientists, and states.²⁶ In a context in which calls to impose a moratorium on SRM research, deployment, and use are multiplying, the authors discuss options for designing a potential international regime to restrict or prohibit this technology. To do so, they examine and draw lessons from existing precedents of prohibitory regimes from many fields, including human rights, arms control, energy, humanitarian, marine, air and space, and environmental

²¹ X. Gong, R. Quitzow & A. Boute, ‘Developing China’s Hydrogen Economy: National Regulation Through Local Experimentation’ (2024) 13(2) *Transnational Environmental Law*, pp. 337–67.

²² G. Mete & L. Reins, ‘Governing New Technologies in the Energy Transition’ (2020) 14(3) *Carbon & Climate Law Review*, pp. 210–31.

²³ Gong, Quitzow & Boute, n. 21 above, p. 365.

²⁴ A. Gupta et al., ‘Towards a Non-Use Regime on Solar Geoengineering: Lessons from International Law and Governance’ (2024) 13(2) *Transnational Environmental Law*, pp. 368–99.

²⁵ United States National Academies of Sciences, Engineering, and Medicine, *Reflecting Sunlight: Recommendations for Solar Geoengineering Research and Research Governance* (National Academies Press, 2021).

²⁶ Gupta et al., n. 24 above, pp. 369–70.

governance. Their analysis shows that there is an extensive array of legal rules, arrangements, and mechanisms that states could use to define lawful and unlawful forms of SRM, restrict its development and use, establish effective and legitimate decision-making procedures, and monitor and promote compliance by states and other actors.

4. The Challenge of Ensuring Voluntary Adherence to Transnational Environmental Norms

Compliance has long been a key problem in transnational environmental law and has given rise to a diverse array of strategies and initiatives to promote and foster the application of formal and informal legal norms.²⁷ Because of a lack of binding obligations and effective central enforcement mechanisms, much of the field of international and transnational environmental law has had to rely on ‘soft law’ commitments and processes to influence the behaviour of states.²⁸ As the article by Niamh Guiry illustrates, the use and potential of soft law instruments in transnational environmental law relies upon a shared belief that ‘non-binding’ legal norms can nonetheless engender adherence on the parts of states. In ‘Why Do States Adhere to the Sustainable Development Goals?’,²⁹ Guiry aims to account for the influence of a particular soft law instrument, namely the Sustainable Development Goals (SDGs), an internationally agreed set of 17 goals and 169 targets that relies on reporting, transparency, and collaboration to influence the agendas and actions of state and non-state actors.³⁰ Her analysis draws on three theoretical frameworks: Harold Koh’s concept of transnational legal processes,³¹ Thomas Franck’s work on the legitimacy and compliance pull of international law,³² and Ryan Goodman and Derek Jinks’ account of the role of social influence in shaping compliance with human rights norms.³³ Rather than single out a particular explanation, Guiry argues that the global influence of the SDG framework rests on multiple factors, specifically their close relationship with international legal obligations, their procedural and substantive legitimacy, the reputational benefits that SDG adherence may provide, and their ability to facilitate socialization and acculturation among states. By providing a complex understanding of the role of ideas, interests, and identities in influencing state

²⁷ A. Čavoški, ‘Transnational Environmental Regulation and Evolving Approaches to Compliance’, in Heyvaert & Ducic-Paoli, n. 1 above, pp. 104–25.

²⁸ J. Brunnée, ‘Enforcement Mechanisms in International Law and International Environmental Law’, in U. Beyerlin, P.-T. Stoll & R. Wolfrum (eds), *Ensuring Compliance with Multilateral Environmental Agreements: A Dialogue between Practitioners and Academia* (Brill, 2006), pp. 1–24.

²⁹ N. Guiry, ‘Why Do States Adhere to the Sustainable Development Goals?’ (2024) 13(2) *Transnational Environmental Law*, pp. 400–27.

³⁰ UNGA Resolution 70/1, ‘Transforming Our World: The 2030 Agenda for Sustainable Development’, 21 Oct. 2015, UN Doc. A/RES/70/1 (2015), available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf.

³¹ H.H. Koh, ‘Why Do Nations Obey International Law?’ (1997) 106(8) *Yale Law Journal*, pp. 2599–659.

³² T.M. Franck, *The Power of Legitimacy Among Nations* (Oxford University Press, 1990).

³³ R. Goodman & D. Jinks, *Socializing States: Promoting Human Rights Through International Law* (Oxford University Press, 2013).

behaviour, Guiry's work may prove helpful in enhancing the effectiveness of softer forms of transnational environmental law.

In 'Refining Reflexive Environmental Law by Nature and Nurture: Autonomy, Accountability, and Adjustability',³⁴ Violet Ross and Lucila de Almeida address the role of transnational environmental law in shaping the behaviour of corporate actors. They focus specifically on the ability of reflexive environmental law (REL) to steer corporations towards the adoption of more sustainable policies and practices. The authors question the traditional definition of REL as limited to self-regulatory mechanisms and argue that any regulatory instrument, even those that have the hallmarks of traditional command-and-control measures, has the potential to engender regulatee reflexivity – a process whereby private actors learn and self-organize in order to meet complex sustainability challenges. Ross and De Almeida present a framework that outlines three reflexive drivers – autonomy, accountability, and adjustability – and eleven REL techniques that can enhance opportunities for regulatory reflexivity. Drawing on this nuanced and multifaceted conception of REL, the authors identify six types of REL instrument, based on self-regulation, disclosure and benchmarking, market incentives, performance standards, or technological prescriptions. The authors' novel approach not only enriches the literature on REL, but it may also enhance the ability of policymakers and scholars to foster the reflexive potential of different forms of transnational environmental law.

5. Conclusion

This issue of *TEL* suggests that the growing complexity of transnational environmental law may be an unavoidable consequence of the intricate nature of contemporary environmental issues and the multifaceted ecological, institutional, legal, economic, and social context that shapes efforts to address them. Scholars remain divided as to the implications of this inherent complexity. For some scholars, the intricacy of transnational environmental law is merely a challenge that must be overcome through innovative and purposive approaches that emphasize reflexivity,³⁵ orchestration,³⁶ or systems thinking.³⁷ Others argue that the field of transnational environmental law exhibits properties of a complex adaptive system and that an earth systems perspective may prove critical in understanding and harnessing its full potential for resolving global environmental challenges.³⁸ We intend for *TEL* to be a key venue for grappling with

³⁴ V. Ross & L. de Almeida, 'Refining Reflexive Environmental Law by Nature and Nurture: Autonomy, Accountability, and Adjustability' (2024) 13(2) *Transnational Environmental Law*, pp. 428–52.

³⁵ *Ibid.*

³⁶ K.W. Abbott, 'Strengthening the Transnational Regime Complex for Climate Change' (2014) 3(1) *Transnational Environmental Law*, pp. 57–88.

³⁷ R.E. Kim & K. Bosselmann, 'International Environmental Law in the Anthropocene: Towards a Purposive System of Multilateral Environmental Agreements' (2013) 2(2) *Transnational Environmental Law*, pp. 285–309.

³⁸ L.J. Kotzé et al., 'Earth System Law: Exploring New Frontiers in Legal Science' (2022) 11 *Earth System Governance*, article 100126; L.J. Kotzé et al., 'Courts, Climate Litigation and the Evolution of Earth System Law' (2024) 15 *Global Policy*, pp. 5–22.

the complexity of transnational environmental law, whether it has become pathological or whether it reflects its potential as a self-organizing system.

6. *TEL* Editorial Board Announcements





It is with gratitude that we say goodbye to Orla Kelleher, who will be moving on from her role as *TEL* Assistant Editor.

We are delighted to welcome to *TEL*'s advisory board Elizabeth Macpherson (University of Canterbury, New Zealand) and Benoit Mayer (University of Reading, UK). Both have been active members of the *TEL* community for years, as frequent reviewers and contributors of multiple pieces, and we are most pleased to formalize this connection with their board membership.

Editors-in-Chief

Thijs Etty
Josephine van Zeben

Editors

Harro van Asselt 
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Sébastien Jodoin 
Leonie Reins 

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