

LEGAL PROTECTION OF THE ENVIRONMENT IN THE CONTEXT OF THE GLOBAL ECOLOGICAL CRISIS: COMPLIANCE MECHANISMS, INTERNATIONAL LIABILITY AND REFORMATORY TRENDS IN CONTEMPORARY LAW

Ciprian Gabriel UNGUREANU*

Abstract

The global ecological crisis has driven a reorientation of contemporary legal systems, placing environmental law at the center of the international normative architecture. This article offers a critical analysis of compliance mechanisms, international liability regimes and reformatory trends that shape the contemporary landscape of environmental law, examining along three dimensions the relationship between normative ambition and legal implementation capacity in the context of the ecological emergency facing the international community. The first dimension examines the architecture of international environmental legal instruments, with emphasis on the structural tension between the voluntary nature of state commitments and the need for efficient coercive mechanisms, drawing on an analysis of the international climate regime established by the Paris Agreement and its functional deficits in relation to its stated objectives. The second-dimension concerns mechanisms of international liability for transboundary ecological damage, tracing the evolution of the principles of state responsibility from the Trail Smelter case to recent judgments of the International Court of Justice and regional human rights courts, with particular reference to the jurisprudence on the no-harm principle. The third-dimension addresses emerging reformatory trends, with focus on three phenomena of utmost relevance for the future of environmental law: the transformation of strategic climate litigation into an instrument for compensating normative deficits, the emergence of the concept of ecocide in international legal discourse, and the prospects of the rights-of-nature movement. The research demonstrates that the effectiveness of environmental law is conditioned not only by the quality of normative instruments, but also by the political will of state actors to transcend short-term national interests in favor of the global ecological common good. The conclusions advocate a structural reform of the international legal architecture of the environment, capable of establishing compulsory compliance mechanisms, effective liability and intergenerational ecological solidarity.

Keywords: environmental law; international liability; climate litigation; ecocide; rights of nature

1. Introduction

At the outset of the third decade of the twenty-first century, environmental law faces challenges of a complexity unprecedented in its normative history. Although its genesis and consolidation as an autonomous legal branch represented a remarkable achievement of international cooperation over the past five decades, its capacity to respond effectively to the imperatives of the global ecological crisis remains uncertain. The climate crisis, the accelerating loss of biodiversity, the degradation of marine and continental ecosystems, desertification, and hydrological scarcity together compose an ecological picture whose normative remedy requires not only the refinement of existing legal technique, but also a structural reconfiguration of the international architecture of environmental governance (Sands et al., 2018). International environmental law, crystallized primarily in the decades following the 1972 Stockholm Conference, is grounded in a model of voluntary cooperation among sovereign states, in which legal commitments are assumed by consent and implemented through compliance mechanisms whose coercive force is often insufficient in relation to the magnitude of the ecological problems addressed. This structural tension between normative ambitions and the realities of implementation constitutes the central theme of the present analytical undertaking¹. Understanding this tension cannot be separated from an analysis of the evolution of international environmental regimes, relevant jurisprudence, and the normative innovations that are redefining the disciplinary horizon of environmental law.

* Lecturer PhD, Faculty of Law and Administrative Sciences, „Ștefan cel Mare” University of Suceava (e-mail: ciprian.ungureanu@fdsa.usv.ro).

¹ Bodansky, D., Brunnée, J., & Rajamani, L., International climate change law, Oxford University Press, 2017.

The timeliness of this topic is confirmed by three convergent trends in the contemporary legal landscape. First, the exponential growth of strategic climate litigation — from a few dozen cases globally in 2017 to more than 2,500 in 2023 ² — signals that courts are becoming relevant normative actors in the field of environmental protection, compensating through judicial jurisdiction for deficits in legislative and executive action. Second, the debate on ecocide and the recognition of the rights of nature reflects a profound philosophical and juridical paradigm shift, challenging the traditional anthropocentric vision of law and proposing ecocentric alternatives with major institutional implications. Third, the gap between the climate commitments assumed under the Paris Agreement and the actual trajectories of global emissions - a gap that, on the basis of current nationally determined contributions, would lead to a rise in average global temperature well in excess of the Agreement's objectives ³ - highlights the functional limits of existing legal instruments and the urgency of reforming the international normative architecture.

This article is structured in three chapters, which aim to map the contemporary landscape of environmental law. The first chapter examines the normative architecture of international environmental regimes, with emphasis on their functional deficits and structural contradictions. The second chapter analyses the regime of international liability for ecological damage, highlighting both jurisprudential progress and persistent normative gaps. The third chapter focuses on emerging reformatory trends - strategic climate litigation, ecocide, and the rights of nature - as innovative normative instruments for compensating the deficits of classical environmental law. The undertaking draws on the analysis of specialized international legal doctrine, relevant jurisprudence of international and national courts, and multilateral environmental treaties, seeking to contribute to the academic debate on the reform of international environmental law in the context of the contemporary ecological emergency. The methodology adopted combines doctrinal-legal analysis with a jurisprudential approach and a political-legal perspective, aiming to transcend monodisciplinary viewpoints and to offer a systemic vision of the functioning and reform of environmental law. This pluridisciplinary approach is not only legitimate but also necessary for a legal field situated at the intersection of ecological science, international political economy, and the philosophy of law - a field that cannot be understood in depth without integrating the complementary perspectives these disciplines offer ⁴. Accordingly, the research seeks not only to describe the current state of environmental law, but also to critically assess its directions of development and to formulate normative guidelines for the reform that is necessary in the face of the ecological challenges of the Anthropocene.

2. The Normative Architecture of International Environmental Regimes: Foundations, Instruments, and Functional Deficits

International environmental regimes represent the institutionalized form of state cooperation in the face of ecological threats that transcend national boundaries. Built upon the foundation of sovereign consensus and the principle of reciprocity, these regimes reflect both the power of multilateral cooperation and the intrinsic limits of an international legal system lacking a center of coercive authority. Analysis of the normative architecture of environmental regimes reveals a legal landscape characterized by instrumental proliferation, institutional fragmentation, and asymmetry between normative ambition and implementation capacity ⁵. Multilateral environmental conventions constitute the backbone of international environmental law, currently numbering more than 1,300 instruments of varying degrees of direct relevance to global ecological protection. From the 1985 Vienna Convention for the Protection of the Ozone Layer and the 1987 Montreal Protocol, to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) ⁶ and the 2015 Paris Agreement, these instruments illustrate the broad range of normative solutions adopted by the international community to address ecosystem degradation ⁷. The Montreal Protocol remains, to this day, the most frequently cited example of successful international environmental cooperation, owing to its balanced combination of differentiated

² UNEP, Global climate litigation report: 2023 status review, United Nations Environment Programme, 2023.

³ IPCC, Climate change 2021: The physical science basis – Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, 2021.

⁴ Kiss, A., & Shelton, D., Guide to international environmental law, Martinus Nijhoff Publishers, 2007.

⁵ *Ibidem*.

⁶ UNFCCC, Paris Agreement, United Nations Framework Convention on Climate Change, 2015. https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

⁷ Sands, P., Peel, J., Fabra, A., & MacKenzie, R., Principles of international environmental law, 4th ed., Cambridge University Press, 2018.

commitments, a facilitative compliance mechanism, and a multilateral funding scheme, having proved its effectiveness through the significant reduction of emissions of ozone-depleting substances.

The 2015 Paris Agreement currently constitutes the central legal instrument of the international climate regime and, at the same time, the most illustrative case study for the paradoxes of international environmental law. By adopting a model of nationally determined contributions (NDCs), the Agreement brought together 196 states, transcending the limits of the Kyoto model based on differentiated and legally binding obligations exclusively for Annex I states⁸. The Agreement does not impose a minimum level of commitments and provides no sanctions for the non-fulfilment of national contributions, instead relying on a non-punitive mechanism for facilitating implementation and promoting compliance⁹. Assessment of the legal effects of the Paris Agreement reveals a major structural deficit: the Global Stocktake mechanism, although designed as an instrument of progressive accountability, functions exclusively through normative pressure and transparency, without compulsory remediation mechanisms for the identified shortfalls.

The 2021 IPCC report demonstrated that emission trajectories projected on the basis of communicated national contributions lead to a rise in global temperature well in excess of the Agreement's objectives, with severe ecological, economic, and social consequences for the most vulnerable populations¹⁰. The 2023 UNEP analysis showed that, even with the full implementation of current climate commitments, the gap relative to the objectives of the Paris Agreement remains dramatic¹¹. This quantitative discrepancy reflects a political constraint: sovereign states do not accept, at the current stage of international law, relinquishing decision-making autonomy in areas with major economic impact.

The institutional fragmentation of international environmental law constitutes another source of systemic dysfunction. The absence of a central international organization with a universal mandate and regulatory power in this field generates overlaps, regulatory gaps, and normative incoherences among different sectoral regimes¹². Conflicting interactions between the international trade regime and environmental norms, tensions between international investment law and national environmental regulations, and competition among state obligations arising from different multilateral environmental conventions all illustrate the costs of normative fragmentation. A structural reform of the institutional architecture of international environmental law remains a first-order doctrinal and political necessity, the urgency of which cannot be underestimated. At the regional level, the European Union has constructed the most coherent and advanced environmental law system, articulated on the legal bases of Articles 191–193 of the Treaty on the Functioning of the European Union and sustained by a comprehensive legislative body, effective compliance mechanisms, and the jurisdiction of the Court of Justice of the European Union¹³. The European Green Deal and its derivative instruments - the European Climate Law, which legally enshrines the objective of climate neutrality by 2050, the Fit for 55 package, and the Carbon Border Adjustment Mechanism - constitute the most ambitious regional ecological transformation program ever adopted at the global level¹⁴. The European experience demonstrates that integrating environmental law into the constitutional architecture of a supranational system, with effective compliance instruments and genuine judicial oversight, is not only possible but capable of producing concrete sectoral transformations, visible in the energy transition and climate policies of member states.

However, the European experience, however valuable as a regional reference model, cannot simply be transposed to the international level in the absence of the necessary institutional structures and political solidarity. On the other hand, the principle of common but differentiated responsibilities - enshrined in the 1992 Rio Declaration and reaffirmed in the Paris Agreement - generates persistent tensions in multilateral environmental negotiations: developing states often invoke the principle to justify less ambitious commitments, while developed states tend to minimize differentiation in favor of a regime of universal obligations¹⁵.

⁸ Bodansky et al., *op.cit.*

⁹ UNFCCC, *op.cit.*

¹⁰ IPCC, *op.cit.*

¹¹ UNEP, *op.cit.*

¹² Birnie, P., Boyle, A., & Redgwell, C., *International law and the environment*, 3rd ed., Oxford University Press, 2009.

¹³ Kramer, L., *EU environmental law*, 8th ed., Sweet & Maxwell, 2016.

¹⁴ European Commission, *European Green Deal: Striving to be the first climate-neutral continent*, Publications Office of the European Union, 2021. https://ec.europa.eu/clima/eu-action/european-green-deal_en

¹⁵ Rajamani, L., Jeffery, L., Höhne, N., Land, T., Matthew, R., Nabel, J., & Schaeffer, M., *National "fair shares" in reducing greenhouse gas emissions within the principled framework of international environmental law*, *Climate Policy* 21(8), 983–1004, 2021. <https://doi.org/10.1080/14693062.2021.1970504>

Overcoming this tension is one of the necessary conditions for an effective reform of the international normative architecture of the environment - a condition without whose fulfilment no international environmental legal instrument can claim to adequately respond to the imperatives of the global ecological crisis.

3. International Liability for Ecological Damage: Jurisprudential Evolution, Guiding Principles, and Normative Gaps

International liability for ecological damage is one of the most complex and contested areas of international environmental law, situated at the intersection of several legal regimes: the law of state responsibility, environmental law, the law of the sea, and human rights law. Its jurisprudential evolution - from the classical precedents of general international law to recent judgments of international and regional courts - reveals a field in continuous normative configuration, marked by doctrinal uncertainties and significant operational gaps ¹⁶.

The jurisprudential foundation of liability for transboundary ecological damage is represented by the Trail Smelter case ¹⁷, in which an international tribunal established the principle that no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein ¹⁸. This decision established the coordinates of the no-harm obligation, a principle subsequently reaffirmed in Principle 21 of the Stockholm Declaration, in Principle 2 of the Rio Declaration, and in the subsequent jurisprudence of international courts. The Trail Smelter decision remains, more than eight decades after it was handed down, an indispensable reference point in international environmental law.

The International Court of Justice has contributed substantially to consolidating the regime of liability for ecological damage through several landmark judgments. In the Corfu Channel case ¹⁹, the Court enshrined the principle that every state has an obligation not to allow knowingly its territory to be used for acts contrary to the rights of other states - a principle with direct applicability to transboundary environmental damage ²⁰. Subsequently, in Pulp Mills on the River Uruguay ²¹, the International Court of Justice significantly developed the procedural obligations of ecological due diligence, ruling that states have an obligation to conduct environmental impact assessments for activities with potentially significant harmful effects on the territory of other states, prior to the authorization of those activities ²². Through this judgment, environmental impact assessment acquired the status of a customary norm of international law, with binding force independent of the specific conventions that enshrine it.

The international liability regime for ecological damage nonetheless presents structural normative gaps that limit its effectiveness. The first concerns the classical distinction in international law between responsibility for internationally wrongful acts - based on the breach of an international obligation - and liability for the injurious consequences of acts not prohibited by international law, known as *sine delicto* liability. The codification of this type of liability has not led to the adoption of legally binding instruments, remaining at the stage of soft law acts with limited normative force ²³. This gap is all the more acute given that activities with the greatest potential for global ecological degradation are generally permitted by international law in the absence of specific conventional prohibitions. The second major gap concerns the diffuse and cumulative character of the most serious forms of contemporary ecological degradation. Climate change, biodiversity loss, or plastic pollution of the oceans are not caused by the activities of a single state or operator, but represent the cumulative effect of millions of individual sources distributed across the entire planet. Legal imputability in such situations raises difficult questions of causation that the classical instruments of international liability law cannot yet resolve ²⁴. Human rights law offers a complementary and increasingly relevant perspective for grounding liability in cases of ecological damage, drawing on the links between environmental degradation and established individual rights.

¹⁶ Sands et al., *op. cit.*

¹⁷ Trail Smelter Arbitration (United States v. Canada), Reports of International Arbitral Awards 3, 1905–1982, United Nations, 1941.

¹⁸ *Ibidem.*

¹⁹ Corfu Channel Case (United Kingdom v. Albania), ICJ Reports 4, 1949.

²⁰ *Ibidem.*

²¹ Pulp Mills on the River Uruguay (Argentina v. Uruguay), ICJ Reports 14, 2010.

²² *Ibidem.*

²³ Birnie et al., *op. cit.*

²⁴ Rajamani et al., *op. cit.*

The UN Human Rights Committee opened a significant avenue in *Ioane Teitiota v. New Zealand* (2020)²⁵, ruling that the return of a citizen of Kiribati could, in certain circumstances, constitute a violation of the right to life guaranteed by the International Covenant on Civil and Political Rights, opening the way for non-refoulement obligations in the climate context²⁶. The European Court of Human Rights consolidated this trend through its judgment in *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland* (2024)²⁷, in which the Grand Chamber ruled that states have positive obligations to adopt and implement effective policies to combat climate change, derived from the guarantees of Article 8 of the Convention concerning the right to respect for private and family life²⁸. Although the Court dismissed some heads of claim on admissibility grounds, the judgment marks a significant transformation in the typology of international environmental obligations. This judgment shifts liability for ecological degradation from the register of environmental law to that of human rights law, configuring new pathways for the legal accountability of states and opening perspectives for similar litigation in other European jurisdictions.

Recent jurisprudential developments in the field of international liability for ecological damage reflect genuine normative progress, but one that remains insufficient given the scale of the global ecological crisis. The consolidation of the ecological due diligence obligation, the extension of human rights applicability to situations of climatic degradation, and the recognition of protection obligations in the context of climate displacement represent irreversible normative acquisitions. Nevertheless, the absence of an operational liability mechanism for the cumulative damages of the global ecological crisis, the gaps in liability codification, and ongoing jurisdictional fragmentation continue to limit the effectiveness of environmental law as an instrument for remedying and preventing ecological damage of a planetary scale²⁹.

4. Reformatory Trends in Environmental Law: Strategic Climate Litigation, the Criminalization of Ecocide, and the Rights of Nature

In the face of the structural deficits of international environmental law, recent years have witnessed the emergence of reformatory trends of remarkable originality and normative ambition³⁰. Strategic climate litigation, the movement to criminalize ecocide, and the recognition of the rights of nature represent expressions of a transformation in the way global civil society conceives of the role of law in relation to the ecological crisis. Analysis of these trends reveals both their innovative potential and the specific limits and risks of each approach³¹. Strategic climate litigation denotes the deliberate use of judicial proceedings as an instrument of normative pressure on governments and corporations, seeking to compensate for the failures of political and normative action through judicial activation. Its exponential growth reflects both the frustration of non-state actors at the insufficient pace of climate action, and methodological advances in the field of climate attribution and the application of human rights in the context of climate change³². The diversity of this litigation is remarkable: cases against states for the inadequacy of national climate policies, cases against corporations for the non-disclosure of climate risks, cases concerning the rights of future generations to a stable climate, and cases concerning the climate due diligence obligation of banks and institutional investors.

Urgenda Foundation v. State of the Netherlands (2019)³³ remains the most widely cited precedent in this field. The Supreme Court of the Netherlands ordered the Dutch state to reduce greenhouse gas emissions by at least 25% relative to 1990 levels by the end of 2020, grounding this obligation not in the Netherlands' international environmental commitments, but in the right to life and the right to private and family life guaranteed by the European Convention on Human Rights³⁴. The originality of the legal reasoning lies in articulating the state's climate protection obligation through the lens of human rights, thereby circumventing

²⁵ Human Rights Committee, *Ioane Teitiota v. New Zealand*, Communication no. 2728/2016, UN Doc. CCPR/C/127/D/2728/2016, 23 January 2020.

²⁶ *Ibidem*.

²⁷ European Court of Human Rights, *Verein KlimaSeniorinnen Schweiz and others v. Switzerland*, Application no. 53600/20, Council of Europe, 9 April 2024.

²⁸ *Ibidem*.

²⁹ McAdam, J., *Climate change, forced migration, and international law*, Oxford University Press, 2012.

³⁰ Terec-Vlad, L., Ungureanu, C. G., & Rusu, A., The right to a healthy environment as an emerging dimension of human rights protection within contemporary international law, *Revista Universul Juridic* 13, 2026.

³¹ UNEP, *op. cit.*

³² *Ibidem*.

³³ *Urgenda Foundation v. State of the Netherlands*, Supreme Court of the Netherlands, ECLI:NL:HR:2019:2007, 20 December 2019.

³⁴ *Ibidem*.

the volatility of commitments assumed in international environmental instruments. The judgment inspired similar cases in Germany, France, Belgium, Australia, and the United States, demonstrating the capacity of a national precedent to generate transnational normative effects of considerable scope.

The Federal Constitutional Court of Germany, through its 2021 judgment (1 BvR 2656/18), declared certain provisions of the Climate Protection Act partially unconstitutional, on the ground that they did not adequately protect the fundamental freedoms of future generations, who would be exposed to disproportionate restrictions in the event of a failure of the ecological transition³⁵. This judgment established a constitutional obligation to protect the climate derived from the right to freedom, opening the way for the integration of climate protection into the constitutional order of states. Corporate climate litigation marks a further development of this trend: in *Milieudefensie and Others v. Royal Dutch Shell* (2021)³⁶, the District Court of The Hague ordered the oil company to reduce its emissions by 45% relative to 2019 levels by 2030, recognizing climate due diligence obligations for private corporations³⁷.

The criminalization of ecocide represents a second major reformatory trend, with the potential to structurally transform international criminal law and environmental law. The term ecocide was taken up and theorized as a legal category by Polly Higgins, who proposed its introduction as the fifth core crime in the Rome Statute of the International Criminal Court³⁸. A panel of international legal experts elaborated a definition of ecocide in 2021: unlawful or wanton acts committed with knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts. This definition seeks to establish a sufficiently high threshold to avoid criminalizing legitimate economic activities, while being sufficiently broad to cover the large-scale ecological destruction caused by extractive, chemical, or agricultural industries. The proposal to amend the Rome Statute raises complex technical issues: the precise definition of gravity thresholds, establishing the mental element (*mens rea*) in the case of long-term and often unforeseeable ecological effects, articulation with existing civil and administrative liability regimes, and ensuring complementarity with national criminal law systems³⁹. Nevertheless, political support for the proposal has grown significantly in recent years, with a number of states parties to the International Criminal Court expressing support for the necessary amendments. The debate on the criminalization of ecocide reflects a profound philosophical transformation of international law: whereas existing instruments protect the individual and collective rights of persons against the most serious abuses, the inclusion of ecocide would signify recognition that ecosystems themselves merit criminal protection, independent of the human harm derived from their degradation.

The rights-of-nature movement proposes a restructuring of legal categories, granting independent legal personality to natural entities (rivers, forests, ecosystems) and permitting these entities to be represented in judicial proceedings by designated human guardians⁴⁰. Although Christopher Stone's 1972 proposal was initially regarded as an exercise in experimental legal thinking, it has gained genuine normative resonance over the past two decades. Ecuador's 2008 Constitution constitutionally enshrined the rights of nature (*Pachamama*), New Zealand recognized through 2017 legislation the legal personality of the Whanganui River, and Colombia's Supreme Court granted subject-of-law status to the Colombian Amazon in 2018⁴¹. These normative developments, unfolding across three continents and in different legal systems, signal that the recognition of the rights of nature is not a marginal aberration, but an emerging trend with genuine normative force and the potential to reconfigure environmental law. The theoretical debate on the rights of nature raises questions such as: can non-human entities exercise rights in the traditional sense of legal theory? Who exercises representation of the interests of nature and on the basis of what criteria? Opponents of the movement argue that ecological interests can be effectively protected through existing legal instruments without resorting to the reconceptualization of the philosophical foundations of civil law⁴². Proponents respond that existing instruments

³⁵ Bundesverfassungsgericht, Neubauer and others v. Germany, 1 BvR 2656/18, Federal Constitutional Court of Germany, 24 April 2021.

³⁶ *Milieudefensie et al. v. Royal Dutch Shell plc*, District Court of The Hague, Case No. C/09/571932 / HA ZA 19-379, 26 May 2021.

³⁷ *Ibidem*.

³⁸ Higgins, P., *Eradicating ecocide: Laws and governance to prevent the destruction of our planet*, Shephard-Walwyn, 2010.

³⁹ Reynolds, J. L., *The governance of solar geoengineering: Managing climate change in the anthropocene*, Cambridge University Press, 2019.

⁴⁰ Stone, C. D., *Should trees have standing? Toward legal rights for natural objects*, *Southern California Law Review* 45, 450–501, 1972.

⁴¹ Kauffman, C. M., & Martin, P. L., *The politics of rights of nature: Strategies for building a more sustainable future*, MIT Press, 2021.

⁴² Gellers, J. C., *The global emergence of constitutional environmental rights*, Routledge, 2017.

have proved insufficient and that granting legal personality to nature fundamentally changes the logic of ecological decision-making, placing nature at the center of legal considerations rather than at their periphery. Regardless of the answer to these questions, the rights-of-nature movement represents a paradigm shift in environmental law: from an instrumental and anthropocentric approach to an ecocentric vision in which ecosystems possess intrinsic value. The integration of artificial intelligence into the application of environmental law constitutes a reformatory trend with considerable potential: satellite monitoring systems and machine learning algorithms allow for the real-time detection of illegal deforestation, pollutant discharges, or the exceeding of emission thresholds, multiplying the monitoring capacities of environmental authorities. The use of artificial intelligence in environmental compliance assessment raises unresolved legal issues concerning algorithmic transparency, liability for automated decisions, and the need for an ethical framework for digital governance in environmental administration.

These reformatory trends together configure an environmental law in transformation — more dynamic and innovative than ever, but also more contested with regard to its philosophical foundations and the limits of normative interventions. The tension between the necessary legal innovation and the inevitable conservatism of legal systems will continue to characterize the evolution of environmental law in the decades ahead. Critical assessment of these trends reveals that they are not mutually exclusive and that their effectiveness is produced in combination: strategic climate litigation can complement the normative action of international treaties; the criminalization of ecocide can create a deterrent effect against large-scale ecological destruction; the rights of nature can shift the decision-making paradigm in favor of long-term ecological considerations. The common foundation of all these trends is this: environmental law cannot remain a law of good intentions and voluntary commitments, but must become a law of real accountability, effective compliance mechanisms, and intergenerational ecological solidarity.

5. Conclusions

The analysis conducted in this article has shown that environmental law faces, at the beginning of the third decade of the twenty-first century, a contradiction without historical precedent: on the one hand, the global ecological emergency demands robust legal instruments, effective compliance mechanisms, and operational liability regimes; on the other hand, the international legal architecture of the environment, grounded in the voluntary consensus of sovereign states and on soft law instruments, remains insufficient to generate genuine compliance at the global level. This contradiction is not circumstantial but structural, rooted in the logic of state sovereignty and in the asymmetry between short-term interests and long-term ecological needs. From the perspective of normative architecture, the reform of international environmental law must address three structural priorities. The first concerns the strengthening of compliance mechanisms in multilateral regimes, through the introduction of elements of binding obligation in environmental law instruments. The second priority involves remedying institutional fragmentation by consolidating the architecture of global environmental governance, including by granting a strengthened normative mandate to the UN Environment Programme. The third priority concerns the construction of a regime of international liability for ecological damage adapted to the specific character of the diffuse and cumulative damages of the contemporary ecological crisis, including mechanisms for the equitable distribution of the costs of ecological adaptation and reparation.

From the perspective of reformatory trends, strategic climate litigation, the criminalization of ecocide, and the rights of nature represent normative vectors with genuine transformative potential, whose doctrinal and jurisprudential development must be followed with critical attention. Judgments such as *Urgenda* (2019), the decision of the German Federal Constitutional Court (2021), and the Grand Chamber judgment of the European Court of Human Rights in *KlimaSeniorinnen* (2024) signal that courts are becoming first-rank normative actors in the contemporary legal ecology, compensating through judicial jurisdiction for the deficits of legislative and executive action. The principal risk of these trends lies in the possible functional overload of courts with decisions of political opportunity, for which they do not possess full democratic legitimacy. The complementarity between normative reform and jurisprudential innovation remains the organising principle of an effective and democratic environmental law.

The effectiveness of environmental law depends not only on the quality of legal instruments, but also on the transformation of global political and economic culture towards recognition of the fundamental interdependence between human prosperity and ecosystem integrity. Environmental law cannot alone

compensate for a deficit of political will; it can, however, catalyze and structure the necessary transformation, providing the normative framework within which intergenerational ecological solidarity can become a legal obligation rather than a mere moral aspiration. Building an environmental law commensurate with the ecological challenges of the Anthropocene remains one of the noblest and most urgent normative missions of contemporary jurisprudence and legal doctrine — a mission whose fulfilment conditions not only the viability of ecosystems, but also the survival of human civilization in its present forms.

References

- Birnie, P., Boyle, A., & Redgwell, C., *International law and the environment*, 3rd ed., Oxford University Press, 2009.
- Bodansky, D., Brunnée, J., & Rajamani, L., *International climate change law*, Oxford University Press, 2017.
- Bundesverfassungsgericht, Neubauer and others v. Germany, 1 BvR 2656/18, Federal Constitutional Court of Germany, 24 April 2021.
- Corfu Channel Case (United Kingdom v. Albania), ICJ Reports 4, 1949.
- European Commission, *European Green Deal: Striving to be the first climate-neutral continent*, Publications Office of the European Union, 2021. https://ec.europa.eu/clima/eu-action/european-green-deal_en
- European Court of Human Rights, Verein KlimaSeniorinnen Schweiz and others v. Switzerland, Application no. 53600/20, Council of Europe, 9 April 2024.
- Gellers, J. C., *The global emergence of constitutional environmental rights*, Routledge, 2017.
- Higgins, P., *Eradicating ecocide: Laws and governance to prevent the destruction of our planet*, Shephard-Walwyn, 2010.
- Human Rights Committee, Ioane Teitiota v. New Zealand, Communication no. 2728/2016, UN Doc. CCPR/C/127/D/2728/2016, 23 January 2020.
- IPCC, *Climate change 2021: The physical science basis – Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 2021.
- Kauffman, C. M., & Martin, P. L., *The politics of rights of nature: Strategies for building a more sustainable future*, MIT Press, 2021.
- Kiss, A., & Shelton, D., *Guide to international environmental law*, Martinus Nijhoff Publishers, 2007.
- Kramer, L., *EU environmental law*, 8th ed., Sweet & Maxwell, 2016.
- McAdam, J., *Climate change, forced migration, and international law*, Oxford University Press, 2012.
- Milieudefensie et al. v. Royal Dutch Shell plc, District Court of The Hague, Case No. C/09/571932 / HA ZA 19-379, 26 May 2021.
- Pulp Mills on the River Uruguay (Argentina v. Uruguay), ICJ Reports 14, 2010.
- Rajamani, L., Jeffery, L., Höhne, N., Land, T., Matthew, R., Nabel, J., & Schaeffer, M., *National “fair shares” in reducing greenhouse gas emissions within the principled framework of international environmental law*, Climate Policy 21(8), 983–1004, 2021. <https://doi.org/10.1080/14693062.2021.1970504>
- Reynolds, J. L., *The governance of solar geoengineering: Managing climate change in the anthropocene*, Cambridge University Press, 2019.
- Sands, P., Peel, J., Fabra, A., & MacKenzie, R., *Principles of international environmental law*, 4th ed., Cambridge University Press, 2018.
- Stone, C. D., *Should trees have standing? Toward legal rights for natural objects*, Southern California Law Review 45, 450–501, 1972.
- Terec-Vlad, L., Ungureanu, C. G., & Rusu, A., *The right to a healthy environment as an emerging dimension of human rights protection within contemporary international law*, Revista Universul Juridic 13, 2026.
- Trail Smelter Arbitration (United States v. Canada), Reports of International Arbitral Awards 3, 1905–1982, United Nations, 1941.
- UNFCCC, Paris Agreement, United Nations Framework Convention on Climate Change, 2015. https://unfccc.int/sites/default/files/english_paris_agreement.pdf
- UNEP, *Global climate litigation report: 2023 status review*, United Nations Environment Programme, 2023.
- Urgenda Foundation v. State of the Netherlands, Supreme Court of the Netherlands, ECLI:NL:HR:2019:2007, 20 December 2019.