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Artificial Intelligence and the Development of International Environmental Law Enforcement Mechanisms: Towards a Legal and Ethical Framework for Global Environmental Governance

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Abstract

Artificial Intelligence (AI) is one of the most prominent technologies capable of fundamentally transforming the mechanisms used to enforce International Environmental Law. It enables states and international organizations to monitor environmental changes in real time, analyze big environmental data, predict ecological risks, and support decision-making processes related to environmental protection and sustainable development.

The rapid advancement of AI applications has significantly enhanced deforestation monitoring, carbon emissions tracking, biodiversity surveillance, and early disaster detection. Consequently, this strengthens the effective implementation of obligations under Multilateral Environmental Agreements (MEAs).

Despite these potentials, the application of AI in the environmental domain raises numerous legal and ethical challenges. These include the absence of a unified international legal framework regulating such technologies, issues surrounding state responsibility for algorithmic decisions, and the evidentiary value of digital evidence generated by AI. Furthermore, there are challenges concerning environmental data protection, respect for state sovereignty, and the imperative to ensure transparency, accountability, and freedom from algorithmic bias.

This study aims to analyze the role that AI can play in enhancing the enforcement of international environmental law, evaluate the associated legal and ethical challenges, and propose an international legal framework grounded in the principles of international environmental law, AI ethics, and global governance to ensure this technology serves environmental protection and sustainable development goals.

Keywords: Artificial Intelligence, International Environmental Law, AI Ethics, Environmental Governance, Sustainable Development.

Introduction

Over the past decade, the world has witnessed an unprecedented transformation in the relationship between technology and international law. This is driven by the rapid evolution of Artificial Intelligence technologies, which are no longer confined to industrial or commercial uses, but increasingly play a pivotal role in managing global issues—chief among them, environmental protection and climate change.

The digital revolution has introduced new tools driven by big data analysis, machine learning, remote sensing, and satellite imagery. These advances have enabled the international community to develop more precise means of tracking pollution, monitoring deforestation, measuring greenhouse gas emissions, and detecting environmental disasters early on, establishing AI as an essential supporting tool for enforcing international environmental law (1).

The significance of this topic stems from the escalation of transboundary environmental threats that national legislation alone can no longer mitigate. This reality has impelled the international community to adopt various Multilateral Environmental Agreements (MEAs), most notably the 1992 Convention on Biological Diversity, the UN Framework Convention on Climate Change (UNFCCC), and the 2015 Paris Agreement. These instruments uniformly emphasize the necessity of fostering international cooperation and advancing scientific and technological tools to ensure the effective implementation of international environmental commitments (2).

However, the increasing deployment of AI has raised novel legal and ethical questions regarding the legitimacy of relying on algorithms for environmental decision-making, the boundaries of state responsibility for autonomous system errors, and the admissibility of digital data before international judicial bodies. Additionally, concerns persist regarding algorithmic bias, lack of transparency, and potential conflicts with state sovereignty over natural resources and the security of sensitive environmental data (3).

Consequently, scholarly inquiry must look beyond how AI is used and address the necessity of formulating an international legal and ethical framework. Such a framework is vital to ensure that technology balances technical innovation with the protection of shared environmental interests. This imperative is reflected in various international initiatives, including UNESCO's 2021 Recommendation on the Ethics of Artificial Intelligence, the OECD Principles on AI, the Council of Europe's Framework Convention on Artificial Intelligence, and the European Union's regulatory approaches to high-risk AI (4).

This study derives its significance from addressing a contemporary subject at the intersection of International Environmental Law and International Law of Technology. It aims to offer a comprehensive legal model for utilizing AI applications in implementing international environmental obligations while defining the necessary legal and ethical safeguards.

Ultimately, the study seeks to go beyond traditional descriptive analysis by examining the relationship between AI and international environmental law as a complementary one—viewing AI not merely as an advanced technology, but as a new legal instrument for enforcing international obligations and furthering the principles of prevention, precaution, sustainable development, environmental justice, and international cooperation.

Research Problem

The main research question is formulated as follows:

To what extent can Artificial Intelligence contribute to enhancing the enforcement of international environmental law, and what international legal and ethical framework is capable of ensuring its responsible use to balance environmental protection with fundamental principles of international law?

Methodology

This study adopts both analytical and comparative methodologies. It analyzes multilateral environmental agreements, examines international instruments on AI ethics, and compares modern international legal trends, relying on contemporary legal scholarship in international environmental law and AI regulation.

Structure of the Study

To address the research problem, this study is structured into two main sections:

- **Section I:** The Role of Artificial Intelligence in Enhancing the Enforcement of International Environmental Law.
- **Section II:** The Legal and Ethical Framework for Deploying Artificial Intelligence in the Enforcement of International Environmental Law.

Section I: The Role of Artificial Intelligence in Enforcing International Environmental Law

The enforcement of international environmental law is no longer confined to traditional mechanisms such as periodic state reporting or institutional oversight under MEAs. The digital revolution has introduced technological tools that are reshaping the concept of international environmental compliance.

AI has emerged as a key instrument capable of increasing the efficacy of international obligations by processing big environmental data, predicting risks, and aiding monitoring, early warning, and decision-making processes. This stems from the fact that most environmental treaties involve continuous obligations—such as monitoring emissions, conserving biodiversity, preventing pollution, and submitting periodic reports—which demand accurate and continuously updated data that AI can supply far more effectively than traditional methods (5).

Accordingly, the relationship between AI and international environmental law is not merely technical, but functional—aimed at improving compliance with international obligations, which aligns with modern approaches viewing technology as a core component of global environmental governance.

Part I: AI as a Mechanism for Monitoring Compliance with International Environmental Agreements

Environmental monitoring is crucial for international environmental enforcement, as compliance cannot be evaluated without reliable data. The adoption of AI technologies has catalyzed a qualitative shift by combining machine learning, satellite image analysis, remote sensing, and digital environmental information systems to facilitate continuous, real-time monitoring.

The 1992 Convention on Biological Diversity establishes that biodiversity protection requires advancing scientific research, information exchange, and deploying appropriate technical tools to monitor and conserve ecosystems, providing a legal foundation for integrating AI tools into treaty implementation (6).

Similarly, the 2015 Paris Agreement established the Enhanced Transparency Framework (ETF) to improve greenhouse gas emissions data collection and monitor the progress of Nationally Determined Contributions (NDCs), a mechanism that increasingly relies on big data analytics (7).

AI-driven satellite imagery can now measure deforestation rates with high precision, track land degradation and desertification, monitor marine oil spills, detect industrial emissions, uncover illegal mining, oversee illicit fishing, and track wildlife trafficking.

The value of these applications extends beyond their technical merit to their capacity to provide objective evidence. This assists international organizations and compliance bodies in assessing state compliance, thereby reinforcing the principle of effective implementation (8).

A prominent example includes the use of AI algorithms by the United Nations Environment Programme (UNEP), the Food and Agriculture Organization (FAO), and Global Forest Watch to analyze millions of satellite images for early detection of tropical deforestation, allowing states to take preventive action before environmental damage escalates.

This progression marks a shift in international environmental law from ex-post supervision to proactive, preventive oversight, aligning with the Prevention Principle, which obligates states to take measures to prevent transboundary environmental harm before it occurs rather than attempting remediation after the fact (9).

Sub-part A: Artificial Intelligence and Enhancing Adherence to the Prevention Principle

The prevention principle is a cornerstone of international environmental law, obligating states to take reasonable measures to prevent transboundary environmental harm. The International Court of Justice (ICJ) affirmed this principle in the *Pulp Mills on the River Uruguay* case, declaring that conducting an Environmental Impact Assessment (EIA) has become a requirement under customary international law where there is a risk of significant transboundary harm (10).

AI enhances this principle through predictive models that analyze historical and real-time environmental data, identifying potential disasters early and suggesting mitigation measures. Beyond traditional EIA, AI enables early warning systems capable of forecasting forest fires, floods, chemical spills, and abnormal emissions, giving national authorities and international organizations time to implement preventive measures (11).

This underscores that AI is not merely a technical tool, but a practical means of operationalizing a fundamental principle of international environmental law.

Part II: The Role of AI in Environmental Risk Prediction and International Decision-Making

AI's role in international environmental law extends beyond tracking violations or gathering data; it serves as a strategic tool for risk prediction and decision support at both national and international levels.

Machine learning algorithms can process massive volumes of environmental and climate data, extracting complex patterns to predict ecological disasters and suggest preventive strategies. This represents a shift in the philosophy of environmental enforcement from post-facto damage management to pre-emptive risk governance (12).

This transition is vital given the complex nature of contemporary environmental problems—such as climate change, biodiversity loss, and transboundary pollution—characterized by high scientific uncertainty. Consequently, environmental decision-making increasingly relies on advanced data analytics, an area where AI displays superior efficiency compared to traditional methods.

Thus, AI represents a crucial scientific instrument supporting the Precautionary Principle, another foundational doctrine of international environmental law.

Sub-part A: AI as an Operationalization of the Precautionary Principle

The precautionary principle requires that protective measures be taken even in the absence of full scientific certainty, provided there are serious indications of potential environmental harm. This principle is codified in Principle 15 of the 1992 Rio Declaration on Environment and Development, which states:

"Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." (13)

AI serves as a practical application of this principle. Machine learning models analyze environmental data continuously to detect early indicators of future harm, even when full scientific certainty is unattainable through traditional means.

Smart systems can forecast droughts, forest fire risks, flood surges, desertification, and species population declines by analyzing satellite imagery, climate data, and biodiversity records, assisting governments and international bodies in executing timely interventions (14).

Furthermore, these systems suggest optimal risk management scenarios, increasing the effectiveness of environmental policies and reducing post-disaster costs.

Sub-part B: Supporting International Environmental Decision-Making

International environmental agreements depend on complex decisions balancing scientific, economic, legal, and political factors. As a result, decision-making increasingly relies on data analytics provided by AI applications.

Under the 2015 Paris Agreement, AI assists in analyzing national emissions data, tracking progress on NDCs, and evaluating mitigation and adaptation policies, supporting bodies overseeing treaty compliance (15).

UNEP also utilizes AI tools to construct environmental models, analyze policy impacts, and assess environmental risks, supplying decision-makers with precise, updated information for national and international planning.

Additionally, AI supports the work of the Intergovernmental Panel on Climate Change (IPCC) by modeling scenarios regarding temperature increases, sea-level rise, and ecosystem shifts, aiding the production of the scientific evidence underlying international decisions.

Sub-part C: AI and the Advancement of Sustainable Development

Beyond facilitating compliance, AI contributes to achieving the Sustainable Development Goals (SDGs) by optimizing resource use, reducing water and energy consumption, improving waste management, and advancing the circular economy.

The UN 2030 Agenda for Sustainable Development emphasizes that innovation and technology are critical drivers for achieving the SDGs, a position reaffirmed by UN General Assembly Resolution A/RES/78/265 (2024) on leveraging safe, secure, and trustworthy AI for sustainable development (16).

However, this positive role requires subjecting AI applications to legal and ethical oversight. Over-reliance on algorithmic systems could yield outcomes at odds with environmental justice or state equality, particularly if developed nations or major corporations monopolize environmental data or processing technologies.

Achieving sustainable development in the digital age requires not only deploying AI for environmental protection, but also ensuring equitable access to technology and encouraging international cooperation in data sharing, reinforcing the principle of Common But Differentiated Responsibilities (CBDR).

Section II: The Legal and Ethical Framework for Deploying AI in Enforcing International Environmental Law

Despite AI's benefits for international environmental enforcement, its deployment introduces legal and ethical challenges linked to the nature of algorithmic systems and the absence of binding international rules governing their environmental use. These issues are heightened when AI influences decisions affecting the global environment, state rights, or future generations.

This regulatory gap stems not from a lack of legal principles, but from the fact that most international environmental law rules were drafted prior to AI. Adapting these rules requires an evolved interpretation suited to digital contexts. Regulating AI should therefore build upon established international environmental law principles, using them as a framework to guide technology toward environmental protection while respecting state sovereignty and fundamental rights.

Part I: Legal Challenges of Using AI in International Environmental Law Enforcement

Sub-part A: The Problem of State Responsibility for Algorithmic Decisions

Traditional rules of state responsibility require attributing an internationally wrongful act to a subject of international law, as codified in the International Law Commission's (ILC) 2001 Articles on Responsibility of States for Internationally Wrongful Acts. However, autonomous or semi-autonomous AI systems complicate attribution when environmental decisions rely on algorithmic outputs (17).

If a state relies on an AI system to calculate emissions or assess environmental risks, and an algorithmic error results in transboundary environmental harm, questions arise regarding liability: Is responsibility borne by the user state, the developer, the corporate owner of the algorithm, or does state responsibility remain intact?

The use of AI does not create a liability vacuum that absolves states, as technology serves as an instrument for fulfilling obligations rather than a replacement for state legal intent. Consequently, states remain internationally responsible for the outcomes of AI systems deployed under their jurisdiction or control, adhering to general principles of attribution in international law (18).

This necessitates developing state responsibility frameworks to include duties regarding the selection of appropriate algorithmic systems, conducting risk assessments, and ensuring effective human oversight over critical environmental decisions.

Sub-part B: The Evidentiary Value of AI-Generated Digital Evidence

Proving environmental harm poses a challenge in international environmental law, particularly regarding transboundary pollution, deforestation, or carbon emissions. The evolution of AI has introduced tools for gathering and analyzing evidence, including satellite imagery, drones, smart sensors, and big data analytics.

While scientifically valuable, the admissibility of such evidence before international courts and tribunals depends on transparency, verifiability, data integrity, and independent expert review. AI should not replace judicial evaluation, but function as an evidentiary aid to help tribunals form findings of fact.

This issue grows in importance as reliance on digital data increases within compliance reporting for the Paris Agreement and the CBD, highlighting the need for standardized international criteria to verify AI-generated digital evidence.

Sub-part C: State Sovereignty and Environmental Data Sharing

AI depends on vast amounts of environmental data, making cross-border data exchange necessary. However, this exchange can conflict with the principle of Permanent Sovereignty over Natural Resources, particularly when data involves strategic resources or sensitive economic and security information.

International cooperation regarding environmental data must build upon digital trust, balancing the international community's need for information to protect global commons with states' rights to protect legitimate interests. This can be achieved through international protocols ensuring data transparency, cybersecurity, and respect for state sovereignty.

Part II: Ethical Governance and International Regulation of AI in Environmental Law Enforcement

AI applications demonstrate significant potential to strengthen the enforcement of international environmental law. However, these tools must operate within a legal and ethical framework ensuring compatibility with fundamental tenets of international law. Technological advancement is not an end in itself, but a instrument for protecting the environment, furthering sustainable development, and upholding human rights (19).

In recent years, the international community has moved toward building normative frameworks for AI regulation through non-binding and binding instruments. Key examples include UNESCO's 2021 Recommendation on the Ethics of Artificial Intelligence, the OECD AI Principles, the Council of Europe's 2024 Framework Convention on AI, and the EU Artificial Intelligence Act (20).

Sub-part A: Ethics of Deploying AI in the Environmental Field

UNESCO's November 2021 Recommendation on the Ethics of Artificial Intelligence represents a global normative framework addressing the ethical and legal dimensions of AI. It asserts that AI development and deployment must respect human rights, human dignity, justice, non-discrimination, environmental sustainability, transparency, accountability, and human oversight (21).

Environmental sustainability holds a prominent place in this recommendation, which calls for minimizing the environmental footprint of AI infrastructure and encouraging AI applications that address climate change and environmental protection.

Similarly, the OECD emphasizes that AI development must be grounded in responsible innovation, risk management throughout the system lifecycle, explainability of outputs, and clear accountability for developers and operators (22).

Applied to international environmental law, these ethics align with traditional principles—notably prevention, precaution, sustainable development, and international cooperation.

Sub-part B: Toward an International Legal Framework for Environmental AI Governance

Despite various international initiatives, the international legal system lacks a comprehensive treaty specifically regulating AI deployment in the environmental sector. This regulatory gap leads to fragmented domestic legislation and hinders effective international cooperation.

An international framework for environmental AI governance should rest on several key pillars:

1. **Algorithmic Environmental Impact Assessment (AEIA):** Obligating states to conduct AEIAs before deploying AI systems in environmentally sensitive sectors.
2. **Effective Human Oversight:** Mandatory human control over critical environmental decisions to ensure legal responsibility remains with public authorities.
3. **Transparency and Explainability:** Establishing international standards for the explainability of algorithmic models used in environmental compliance and reporting.
4. **Data Protection and Sharing:** Enhancing international data-sharing protocols while respecting state sovereignty and digital security.
5. **Algorithmic Auditing:** Establishing an international environmental algorithmic auditing mechanism under the auspices of the UN or UNEP.

Sub-part C: Toward the Principle of "Algorithmic Sustainability"

In light of rapid technological shifts, this study proposes recognizing "Algorithmic Sustainability" as a doctrine to guide the evolution of international environmental law.

This principle posits that the design, development, and deployment of AI systems must be conducted in a manner that avoids harm to the environment, biodiversity, or the rights of future generations. Furthermore, AI systems must remain subordinate to the principles of prevention, precaution, transparency, accountability, human oversight, and sustainability.

Adopting this perspective marks a shift from merely "regulating the use of AI" to a broader paradigm: "subordinating AI to the principles of international environmental law."

Conclusion

The evolution of AI applications has driven a qualitative shift in international environmental law enforcement. Environmental protection no longer relies exclusively on traditional mechanisms, such as post-facto reporting, but increasingly utilizes digital systems capable of continuous monitoring, big data processing, and predictive risk modeling.

These technical capabilities offer an opportunity to enhance compliance under MEAs, such as the Paris Agreement and the CBD. However, these benefits introduce legal and ethical challenges that require structured international regulation.

Key Findings

- AI has become an essential supporting mechanism for enforcing international environmental law due to its monitoring, analytical, and predictive capacities.

- AI aids the operationalization of core principles of international environmental law, particularly prevention, precaution, and sustainable development.
- Current international law lacks a dedicated, unified legal framework governing the environmental application of AI.
- Deploying AI does not transfer or diminish international state responsibility for decisions or actions executed via algorithmic systems.
- Soft law instruments (UNESCO, OECD, Council of Europe) offer a foundational normative basis for developing binding international rules.

Recommendations

- Draft an international instrument or supplementary protocol under UN auspices specifically regulating AI deployment in environmental protection and treaty enforcement.
- Mandate Algorithmic Environmental Impact Assessments (AEIAs) prior to deploying AI systems in sensitive ecological domains.
- Adopt uniform international standards regarding algorithmic transparency and explainability in environmental compliance.
- Promote international cooperation in environmental data sharing while respecting state sovereignty and cyber security requirements.
- Establish a specialized international mechanism for auditing AI systems used in MEA enforcement.
- Support capacity building in developing nations to ensure equitable access to environmental AI tools and prevent widening technological divides, pursuant to the CBDR principle.

Footnotes

1. Yousofi Majd, M., Norouzi, M., & Tayebi, S., "Feasibility of Artificial Intelligence in the Enforcement of International Environmental Law", Legal Studies in Digital Age, 2026, pp. 1-13.
2. *Convention on Biological Diversity*, 1992; *United Nations Framework Convention on Climate Change (UNFCCC)*, 1992; *Paris Agreement*, 2015, Arts. 2, 4, 7, 13.
3. UNESCO, *Recommendation on the Ethics of Artificial Intelligence*, 2021; https://www.coe.int/en/web/artificial-intelligence/the-framework-convention-on-artificial-intelligence

OECD, *Recommendation of the Council on Artificial Intelligence*, 2019; UNEP, *Environmental Rule of Law: First Global Report*, 2019. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449

4. Council of Europe, *Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, opened for signature 5 September 2024; European Union, *Regulation (EU) 2024/1689 (Artificial Intelligence Act)*, 2024. https://eur-lex.europa.eu/eli/reg/2024/1689/oj
5. Aql Al-Sandid, B. (2026). The legal framework governing the contribution of artificial intelligence to environmental sustainability: Foundations and challenges – A comprehensive legal-technical approach and a comparative study. Political Sciences and Law Series, 5(2). https://doi.org/10.59759/law.v5i2.1943
6. Ditria, E. M., Buelow, C. A., Gonzalez-Rivero, M., & Connolly, R. M. (2022). Artificial intelligence and automated monitoring for assisting conservation of marine ecosystems: A perspective. Frontiers in Marine Science, 9, Article 918104. https://doi.org/10.3389/fmars.2022.918104

Convention on Biological Diversity, Rio de Janeiro, 1992, Preamble and Arts. 7, 12, 17, 18.

7. *Paris Agreement*, 2015, Art. 13 (Enhanced Transparency Framework).
8. Ibid., Arts. 4 & 7.
9. Yousofi Majd, M., Norouzi, M., & Tayebi, S., op. cit., pp. 1-13.
10. *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, p. 14, para. 204; *Rio Declaration on Environment and Development*, 1992, Principle 2. https://www.icj-cij.org/case/135/judgments
11. Reichstein, M., Benson, V., Blunk, J., Camps-Valls, G., Creutzig, F., Fearnley, C. J., Han, B., Kornhuber, K., Rahaman, N., Schölkopf, B., Tárraga, J. M., Vinuesa, R., Dall, K., Denzler, J., Frank, D., Martini, G., Nganga, N., Maddix, D. C., & Weldemariam, K., "Early Warning of Complex Climate Risk with Integrated Artificial Intelligence", Nature Communications, vol. 16, Article No. 2564, 2025, pp. 1-13. https://doi.org/10.1038/s41467-025-57640-w
12. Thomas Le Goff, "Environmental Law's Principles Applied to Artificial Intelligence: A Path Towards Regulation", International Review of Law, Computers & Technology, 2025, pp. 1-24.
13. *Rio Declaration on Environment and Development*, 1992, Principle 15; James Cameron & Juli Abouchar, "The Status of the Precautionary Principle in International Law", in David Freestone & Ellen Hey (eds.), *The Precautionary Principle and International Law*, Kluwer Law International, 1996.
14. Yousofi Majd, M., Norouzi, M., & Tayebi, S., op. cit., pp. 1-13.

15. *Paris Agreement*, 2015, Arts. 4, 7, 13, 14.
16. United Nations General Assembly, *Seizing the Opportunities of Safe, Secure and Trustworthy Artificial Intelligence Systems for Sustainable Development*, A/RES/78/265, 21 March 2024; United Nations, *Transforming our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1, 2015. https://digitallibrary.un.org/record/4043244/?ln=en&v=pdf
17. International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries, Yearbook of the International Law Commission, 2001, vol. II, Part Two. https://legal.un.org/ilc/texts/9_6.shtml
18. https://doi.org/10.3389/fmars.2022.918104
19. Seth D. Baum & Andrea Owe, "Artificial Intelligence Needs Environmental Ethics", *Ethics, Policy & Environment*, Vol. 26, 2023, p. 139.
20. Council of Europe, *Framework Convention on Artificial Intelligence*, 2024, op. cit.
21. UNESCO, *Recommendation on the Ethics of Artificial Intelligence*, 2021, Section III.2 and Policy Area 5.
22. OECD, *Recommendation of the Council on Artificial Intelligence*, 2019 (revised 2024); OECD, *OECD Due Diligence Guidance for Responsible AI*, OECD Publishing, Paris, 2026.

Bibliography

First: International Conventions, Declarations, and Legal Instruments

1. Convention on Biological Diversity. (1992). Convention on Biological Diversity. Rio de Janeiro, 5 June 1992. Available at: https://www.cbd.int/convention/text/
2. United Nations Framework Convention on Climate Change. (1992). United Nations Framework Convention on Climate Change. Available at: https://unfccc.int/resource/docs/convkp/conveng.pdf
3. United Nations. (1992). Rio Declaration on Environment and Development. In Report of the United Nations Conference on Environment and Development, A/CONF.151/26 (Vol. I), Annex I.
4. United Nations. (2015). Paris Agreement. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf
5. Council of Europe. (2024). Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. Opened for signature on 5 September 2024. Available at: https://www.coe.int/en/web/artificial-intelligence/the-framework-convention-on-artificial-intelligence
6. European Parliament and Council of the European Union. (2024). Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act). Official Journal of the European Union. Available at: https://eur-lex.europa.eu/eli/reg/2024/1689/oj

Second: Judicial Decisions and Legal Documents Issued by International Bodies

International Court of Justice. (2010). Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010, p. 14. Available at: https://www.icj-cij.org/case/135/judgments

International Law Commission. (2001). Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries. Yearbook of the International Law Commission, 2001, Vol. II, Part Two. Available at: https://legal.un.org/ilc/texts/9_6.shtml

Third: Recommendations, Reports, and Institutional Documents

9. United Nations Educational, Scientific and Cultural Organization (UNESCO). (2021). Recommendation on the Ethics of Artificial Intelligence. Paris: UNESCO.
10. Organisation for Economic Co-operation and Development (OECD). (2019, amended 2024). Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449. Available at: https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449
11. United Nations Environment Programme (UNEP). (2019). Environmental Rule of Law: First Global Report. Nairobi: UNEP.
12. United Nations General Assembly. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. A/RES/70/1.
13. United Nations General Assembly. (2024). Seizing the Opportunities of Safe, Secure and Trustworthy Artificial Intelligence Systems for Sustainable Development. A/RES/78/265, 21 March 2024. Available at: https://digitallibrary.un.org/record/4043244/
14. Organisation for Economic Co-operation and Development (OECD). (2026). OECD Due Diligence Guidance for Responsible AI. Paris: OECD Publishing. https://doi.org/10.1787/41671712-en

Fourth: Scientific Articles and Academic Studies

15. Aql Al-Sandid, B. (2026). The legal framework governing the contribution of artificial intelligence to environmental sustainability: Foundations and challenges – A comprehensive legal-technical approach and a comparative study. Political Sciences and Law Series, 5(2). https://doi.org/10.59759/law.v5i2.1943
16. Baum, S. D., & Owe, A. (2023). Artificial intelligence needs environmental ethics. Ethics, Policy & Environment, 26(1), 139–143. https://doi.org/10.1080/21550085.2022.2076538
17. Ditria, E. M., Buelow, C. A., Gonzalez-Rivero, M., & Connolly, R. M. (2022). Artificial intelligence and automated monitoring for assisting conservation of marine ecosystems: A perspective. Frontiers in Marine Science, 9, Article 918104. https://doi.org/10.3389/fmars.2022.918104
18. Le Goff, T. (2026). Environmental law's principles applied to artificial intelligence: A path towards regulation. International Review of Law, Computers & Technology, 40(1), 74–97. https://doi.org/10.1080/13600869.2025.2506166
19. Reichstein, M., Benson, V., Blunk, J., Camps-Valls, G., Creutzig, F., Fearnley, C. J., Han, B., Kornhuber, K., Rahaman, N., Schölkopf, B., Tárraga, J. M., Vinuesa, R., Dall, K., Denzler, J., Frank, D., Martini, G., Nganga, N., Maddix, D. C., & Weldemariam, K. (2025). Early warning of complex climate risk with integrated artificial intelligence. Nature Communications, 16, Article 2564. https://doi.org/10.1038/s41467-025-57640-w

20. Yousofi Majd, M., Norouzi, M., & Tayebi, S. (2026). Feasibility of artificial intelligence in the enforcement of international environmental law. Journal of Legal Studies in Digital Age, 5(2), 11.20. Yousofi Majd, M., Norouzi, M., & Tayebi, S. (2026). Feasibility of artificial intelligence in the enforcement of international environmental law. Journal of Legal Studies in Digital Age, 5(2), 11.