



Legal Protection of Environment in the Era of AI

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Abstract

Artificial Intelligence (AI) is no longer a futuristic concept—it is a present-day force shaping how societies operate, including in the critical domain of environmental protection. With rising environmental challenges like climate change, loss of biodiversity, rising pollution, and unsustainable resource, there is an urgent need for innovative, data-driven tools and technology to address these complex issues. The chapter highlights how AI contributes positively to environmental sustainability by enabling real-time pollution tracking, optimizing renewable energy systems, forecasting climate patterns, managing natural resources more efficiently, and improving conservation practices. However, the integration of AI into environmental systems is full of challenges—especially legal and ethical ones. Existing environmental laws were designed long before AI entered the mainstream use and often lack provisions for regulating automated decision-making or data generated by intelligent systems. The study examines these gaps and critiques of the current legal frameworks in both national and international contexts. At the heart of this analysis is the need for balance: how to embrace technological advancement without compromising environmental justice, ethical standards, or the rule of law. The paper explores whether AI tools can uphold or even enhance the principles of environmental equity, participation, and accountability. It also considers how current legal systems can evolve to ensure responsible innovation. In conclusion, the paper does not merely present the advantages or risks of AI in environmental applications, it offers a comprehensive policy-oriented framework. It calls for the enactment of AI-specific environmental legislation, international legal collaboration, judicial adaptation, open data policies, and the creation of “Green AI” standards. Thus, this chapter provides

both critique and a roadmap—providing insights into the promise AI holds for the planet, while urging legal systems to keep pace with this rapidly evolving technology. It serves policymakers, legal scholars, technologists, and environmentalists looking to bridge the gap between digital innovation and ecological protection.

Keywords: Environment, Artificial Intelligence, Protection, Pollution, Legal, Sustainability.

Introduction

The 21st century faces dual challenges- the need for technological advancement and the urgent necessity to address environmental degradation. AI with its ability of data analysis, predictive modeling, and automation, is increasingly viewed as a catalyst in achieving environmental sustainability. Yet, legal structures often lag behind such advancements, posing new ethical, regulatory, and socio-economic questions. AI has emerged as a defining force in reshaping the modern world, particularly in sectors that rely on knowledge, innovation, and information. Among these, education stands out as a domain where AI is not only transforming processes but redefining the roles of its core participants—teachers, students, and institutions. In the context of higher education, AI is more than just a tool for automating tasks; it is becoming an integral component in customizing learning experiences, managing institutional operations, and supporting research initiatives. This chapter explores the various dimensions in which AI is influencing higher education and its implications for teachers, analyzing both opportunities and challenges associated with this technological shift. By understanding the multifaceted impacts, stakeholders in education can better adapt to the evolving educational landscape and leverage AI in meaningful, ethical, and sustainable ways.

The advent of AI marks a pivotal moment in human history, akin to the industrial revolution or the dawn of the internet. Its pervasive influence is rapidly reshaping industries, economies, and societal structures worldwide. Education, particularly higher education, stands at the precipice of this transformative wave, grappling with both the immense opportunities and significant challenges that AI presents. From automating administrative tasks to revolutionizing pedagogical approaches and personalizing learning experiences, AI is fundamentally altering the landscape of universities and colleges. This study delves into the multifaceted impact of AI on higher education, critically examining its transformative potential, the evolving role of teachers, and the inherent challenges and ethical considerations that must be addressed to harness AI responsibly and effectively for the future of learning and teaching.

This chapter investigates the multi-dimensional relationship between AI and the environment, exploring how law can act as a facilitator of positive change while preventing misuse and adverse consequences.

Understanding Artificial Intelligence

Artificial Intelligence refers to systems or machines that mimic human intelligence to perform tasks and can iteratively improve themselves based on the information they collect. The idea dates back to ancient civilizations, but its contemporary form gained track with the advent of computers. There are two main types of AI- Narrow AI, which is designed to perform a specific task, and General AI, which can theoretically perform any intellectual task that a human can. Machine learning, deep learning, neural networks, and natural language processing are some core components of AI. These systems can process vast amounts of data and generate insights, predictions, and decisions in real time. In education, AI systems can analyze student performance, adapt learning paths, automate administrative functions, and even perform complex tasks like essay evaluation or real-time student sentiment analysis. This level of automation and adaptability has immense implications for teachers and institutions alike.

AI Applications in Higher Education

The integration of AI into higher education is evident across a range of functions, transforming how institutions operate and deliver learning. Some key areas include:

- **Adaptive Learning Platforms:** Tools like Knewton and DreamBox adapt content delivery based on student performance, helping identify strengths and weaknesses in real time.
- **Virtual Teaching Assistants:** AI bots like Georgia Tech's 'Jill Watson' assist students with queries, reducing response time and improving support accessibility.
- **Predictive Analytics:** Universities are leveraging AI to identify students at risk of dropping out by analysing behavioral, attendance, and academic data.
- **Automated Grading and Feedback:** Tools like Gradescope and Turnitin use AI to evaluate essays, detect plagiarism, and give timely feedback, enabling teachers to manage large class sizes effectively.
- **AI-Enabled Research Support:** Platforms like Semantic Scholar and Connected Papers help researchers find relevant academic content, summarize papers, and generate citations efficiently.
- **Chatbots and Virtual Counselors:** AI-driven chatbots can manage admission queries, offer career guidance, and simulate counseling sessions, reducing the workload on support staff.

- **Intelligent Scheduling:** AI systems can optimize class schedules, exam timetables, and room allocations based on real-time availability and institutional requirements.

The Evolving Role of Teachers in the AI Era

While AI offers powerful tools, it does not diminish the importance of human teachers; rather, it redefines their role, shifting the focus from information dissemination to higher-order pedagogical functions.

- **Shift from Information Dispenser to Facilitator and Mentor**

Traditionally, teachers have been primary conduits of information. With AI capable of delivering content, answering factual questions, and even providing basic explanations, the teacher's role is evolving:

- **Facilitator of Learning:** Teachers will increasingly act as guides, helping students navigate AI-powered learning environments, interpret AI-generated insights, and develop critical thinking skills to evaluate information.
 - **Mentor and Coach:** The human element of teaching—mentorship, emotional support, and fostering a sense of belonging becomes even more crucial. Teachers will focus on developing students' soft skills, such as collaboration, communication, creativity, and problem-solving, which are essential for success in an AI-driven world.
 - **Cultivator of Higher-Order Thinking:** AI can handle rote tasks, allowing teachers to dedicate more time to fostering critical analysis, ethical reasoning, complex problem-solving, and innovative thinking among students.
- **AI as a Teacher's Assistant**

AI tools can significantly reduce the administrative and assessment workload on teachers, allowing them to focus more on teaching and student interaction:

 - **Automated Grading:** AI can efficiently grade objective assessments (e.g., multiple-choice, fill-in-the-blank) and even provide preliminary feedback on essays, highlighting grammatical errors or structural issues. This free up teachers to focus on providing qualitative, in-depth feedback on complex assignments.
 - **Performance Analytics and Insights:** AI platforms can provide teachers with detailed analytics on student engagement, progress, and areas of difficulty, enabling them to intervene proactively and tailor their instructions to address specific learning gaps.
 - **Content Curation and Resource Generation:** AI can assist teachers in finding relevant learning materials, generating practice questions, or even

creating customized lesson plans based on learning objectives and student needs.

- **Curriculum Development and Design**

The integration of AI necessitates a re-evaluation and redesign of existing curricula to ensure students are prepared for an AI-driven future:

- **AI Literacy:** It becomes imperative to integrate AI literacy across disciplines, teaching students not just how to use AI tools, but also how they work, their limitations, ethical implications, and societal impact.
- **Skills for the Future:** Curricula must emphasize skills that complement AI capabilities, such as creativity, critical thinking, complex problem-solving, emotional intelligence, and interdisciplinary collaboration. The focus shifts from memorization to application and innovation.
- **Designing AI-Augmented Learning Experiences:** Teachers will need to design learning activities that effectively leverage AI tools, promoting active learning and deeper engagement rather than passive consumption.

- **Professional Development for Educators**

To effectively navigate this evolving landscape, comprehensive professional development for educators is paramount:

- **Training in AI Tools:** Teachers need training on how to effectively use AI-powered learning platforms, assessment tools, and administrative assistants.
- **Pedagogical Shifts:** Professional development should focus on new pedagogical approaches that emphasize facilitation, mentorship, and the development of higher-order thinking skills in an AI-rich environment.
- **Ethical AI Use:** Educators must be trained on the ethical implications of AI in education, including data privacy, algorithmic bias, and academic integrity, to ensure responsible and equitable implementation.
- **Continuous Learning:** The rapid pace of AI development means that professional development must be ongoing, fostering a culture of continuous learning and adaptation among educators.

Impact on Teachers

Teachers, as the cornerstone of any educational institution, face both challenges and opportunities with the advent of AI:

- **Evolving Role:** Teachers are increasingly seen as facilitators, mentors, and collaborators rather than just content deliverers. With AI handling content personalization and grading, educators can invest more in mentoring and interpersonal support.

- **Professional Development:** Teachers must now acquire digital literacy and AI-related competencies. This involves training in data interpretation, tool usage, and ethical considerations in AI-based education.
- **Time Efficiency:** Tasks such as attendance, assessment, and feedback can now be automated, allowing teachers to focus on pedagogy, creativity, and research.
- **Ethical Responsibilities:** Teachers must guide students on appropriate AI usage, discouraging over-dependence on tools like ChatGPT or automatic translation for assignments.
- **Job Security:** While AI augments teaching roles, some fear replacement or redundancy. However, human connection, critical thinking, and ethical reasoning are core aspects of education—remain irreplaceable.
- **Creativity and Innovation:** With AI taking over routine tasks, teachers have more freedom to innovate in classroom delivery, gamify content, or experiment with interdisciplinary teaching.

Benefits of AI Integration

- **Enhanced Student Engagement:** Adaptive platforms and gamified learning keep students motivated.
- **Scalability:** Online AI-driven platforms can reach thousands of learners simultaneously.
- **Data-Driven Insights:** Teachers and administrators gain actionable insights into student performance.
- **Accessibility:** AI supports inclusive education by offering speech-to-text, translation, and assistive technology for differently-abled learners.
- **Efficient Administration:** AI simplifies tasks like scheduling, admissions, and resource management.

Challenges and Concerns

- **Algorithmic Bias:** AI systems may reflect societal biases in data, affecting decision-making.
- **b. Loss of Human Interaction:** Excessive reliance on AI may reduce the empathetic, emotional side of education.
- **Digital Divide:** Students and teachers in under-resourced regions may struggle with infrastructure and access.
- **Ethical Concerns:** Data privacy, informed consent, and academic integrity become complex issues in AI-powered education.

- **Resistance to Change:** Some educators resist adopting new technologies due to lack of training, confidence, or awareness.

Case Studies and Global Examples

- **India: AI in Pollution Monitoring**

The Central Pollution Control Board (CPCB) of India uses AI to analyze air quality data from hundreds of sensors in real time. It helps identify pollution hotspots in Delhi and offers actionable insights. Government-backed SWAYAM platform offers MOOCs with AI-driven dashboards that help students track progress and receive recommendations.

- **China: AI for Carbon Reduction**

China integrates AI in smart cities and electric vehicle management to reduce urban carbon emissions. AI algorithms optimize traffic flows, reducing idle time and fuel consumption. Squirrel AI is a fully adaptive AI-powered platform used by millions of students to provide personalized tutoring.

- **EU: Environmental AI Regulation**

The European Union has proposed the AI Act, which classifies environmental AI systems based on risk. High-risk AI used in critical infrastructure must comply with stringent transparency and accountability norms.

- **USA – Arizona State University**

Leveraging AI to provide real-time academic advising and intervention based on predictive modeling.

- **UK – The Open University**

Using AI for learning analytics and early student support interventions in distance education.

- **Finland – 100 Experiments Initiative**

Testing AI tools in classrooms to enhance learning outcomes and reduce teacher workload.

Future Outlook

The next decade will likely see AI becoming more deeply embedded in educational ecosystems. Emerging technologies like generative AI, emotion AI, and augmented intelligence will redefine interactivity in classrooms. Students may learn via AI tutors that can simulate human conversation and adapt based on voice tone, eye movement, or past behavior. Blockchain integrated with AI may secure academic records. While AI will never replace teachers, it will continue to change how they teach, assess, and mentor. A balanced approach—where AI complements rather than replaces human intelligence is crucial to preserve the soul of education.

Philosophical and Ethical Reflections

At its core, education is a human endeavor. In the era of technology, should machines decide what is best for students? Can AI teach empathy or morality? How do we ensure fairness and transparency in AI algorithms? These questions demand serious discourse. Teachers must become ethical stewards of AI tools—ensuring technology enhances rather than compromises human dignity in education. The intersection of AI and environmental sustainability raises profound philosophical and ethical questions that transcend technological capability. At its core lies the question—*Should machines make decisions about nature on behalf of humanity?* This inquiry challenges anthropocentric worldviews that place humans at the center of ethical concern, prompting a shift towards an eco-centric ethic, one that recognizes the intrinsic value of nature, independent of its utility to humans.

From a utilitarian perspective, AI offers significant benefits by maximizing outcomes such as efficient use of resources, and climate change mitigation. However, deontological ethics is cautious against over-reliance on autonomous systems, especially when AI actions lack transparency or accountability. Delegating stewardship of the planet to non-sentient systems without moral agency risks eroding human responsibility and ethical deliberation.

The ethical principle of *environmental justice* also plays a central role. AI systems trained on biased or incomplete data can inadvertently marginalize vulnerable communities, reinforcing inequities in resource distribution or exposure to environmental harm. Moreover, the development and deployment of AI itself demand energy and resources, raising the ethical dilemma of whether the environmental cost of AI innovation outweighs its green benefits. Furthermore, as AI grows increasingly capable of monitoring and managing ecosystems, questions of surveillance, consent, and data rights become ethically relevant. Who owns environmental data? Can indigenous knowledge systems coexist with algorithmic governance?

Thus, ethical reflections on AI and the environment must embrace a holistic approach—one that balances innovation with empathy, efficiency with equity, and technological optimism with philosophical humility.

Understanding Artificial Intelligence and Environmental Sustainability

• Defining Artificial Intelligence& Environmental Sustainability

AI encompasses computer systems that mimic human cognitive functions such as learning, problem-solving, and decision-making. It includes subfields like machine learning, deep learning, natural language processing, and robotics. Environmental sustainability refers to responsible interaction with the environment to avoid depletion or degradation of natural resources, ensuring long-term ecological balance.

- **Synergies between AI and Environmental Goals**

AI can serve environmental goals in the following ways:

- **Monitoring Pollution and Emissions:** AI technologies, especially when combined with sensors, satellite imagery, and IoT (Internet of Things) devices, are used to monitor air, water, and soil pollution in real-time. Machine learning models can analyze vast amounts of environmental data to detect anomalies, identify pollution sources, and track emission levels more accurately than traditional methods. For instance, AI can identify illegal industrial discharges or measure urban air quality every few seconds, enabling quicker enforcement of environmental laws and preventive measures.
- **Managing Energy Systems:** AI plays a critical role in optimizing energy generation, storage, and distribution, especially in smart grid systems. It helps forecast electricity demand, regulate load balancing, and integrate renewable sources like solar and wind by predicting their output more accurately. AI can also automate switching between energy sources and manage battery storage systems, reducing wastage and improving energy efficiency. This is vital for reducing dependency on fossil fuels and lowering greenhouse gas emissions.
- **Predicting Climate Patterns:** Climate modeling requires processing massive datasets on temperature, ocean currents, CO₂ levels, etc. AI enhances these models by identifying patterns and correlations that traditional models might miss. It can improve the accuracy of long-term climate forecasts and short-term weather predictions, including the early detection of natural disasters like floods, hurricanes, and droughts. These predictions help governments and communities prepare more effectively, saving lives and minimizing environmental damage.
- **Enhancing Conservation Efforts:** AI tools are used in wildlife conservation, forest management, and ecosystem monitoring. For example, AI-powered drones and camera traps can track animal movements, detect poaching activities, or assess deforestation in remote areas. Machine learning can analyze audio data to monitor endangered bird or whale populations, or satellite images to detect illegal logging. These insights allow conservationists to act quickly and allocate resources more efficiently.

- **Supporting Sustainable Agriculture and Resource Allocation:** In agriculture, AI supports precision farming by analyzing data on soil health, moisture levels, weather forecasts, and crop conditions. AI-driven tools help farmers determine the optimal time to plant, water, and harvest, minimizing pesticide and fertilizer use. This reduces environmental impact while maximizing yield. Additionally, AI assists in resource allocation—like water usage planning or land conservation—by providing data-based recommendations tailored to specific regions or needs.

Key Environmental Benefits of AI

- **Smart Energy Systems**

AI optimizes energy production and distribution through smart grids, reducing energy loss and increasing reliance on renewable sources. Predictive analytics allow efficient load balancing, integration of solar and wind energy, and real-time adjustments in energy consumption. AI significantly enhances the efficiency of energy production and distribution, especially through the use of *smart grids*. A smart grid uses AI algorithms to collect and analyze data from various points in the power network—such as power stations, transformers, and end users. This allows real-time monitoring and predictive management of electricity demand and supply. For example, AI can forecast electricity usage patterns, enabling better integration of *renewable sources* like solar and wind, which are inherently variable. It also assists in *load balancing*, i.e., distributing energy evenly to avoid overloads or outages. The result is reduced energy waste, cost savings, and lower greenhouse gas emissions.

- **Climate Change Mitigation**

AI aids in modeling climate patterns and forecasting extreme weather events. For example, Google's DeepMind uses AI to improve the energy efficiency of data centers, reducing carbon emissions significantly. AI plays a crucial role in analyzing large datasets related to climate—such as ocean temperatures, CO₂ levels, glacier movement, and weather trends. These insights improve the accuracy of *climate modeling* and early warning systems for extreme weather events like hurricanes or droughts. A notable example is *Google's DeepMind*, which uses AI to optimize the energy usage of data centers, cutting their cooling energy by up to 40%. Such advancements directly contribute to *lowering global carbon footprints* and supporting mitigation goals under frameworks like the Paris Agreement.

- **Biodiversity and Wildlife Protection**

AI-enabled drones and remote sensors monitor endangered species, track poachers, and analyze ecosystems. IBM's AI system has been used to identify illegal logging and animal trafficking patterns through satellite imagery. Conservationists use AI to protect ecosystems and endangered species. Drones equipped with AI-powered cameras and sensors can patrol large forested or protected areas, identifying illegal

activities such as *poaching* or *deforestation*. AI also analyzes satellite images to detect patterns of *illegal logging* or changes in forest cover. IBM, for instance, developed AI tools to monitor wildlife movements and detect threats using real-time image and sound data. These technologies make wildlife surveillance faster, less labor-intensive, and more accurate.

- **Waste Management and Promoting Circular Economy**

AI improves waste segregation using computer vision and robotics, leading to more efficient recycling processes. Smart bins powered by AI can identify recyclable materials and sort them automatically. AI helps tackle the growing challenge of waste by revolutionizing how it is identified, sorted, and processed. *Computer vision* enables machines to distinguish between recyclable and non-recyclable materials. *Robotic arms* can then sort these materials on conveyor belts in recycling plants more accurately than humans. In public spaces, *smart bins* embedded with AI sensors can detect and sort waste types (plastic, paper, organic, etc.) automatically. This increases recycling efficiency, reduces landfill waste, and promotes *circular economy* practices.

- **Sustainable Agriculture**

AI supports precision agriculture by predicting crop yields, optimizing irrigation, detecting pest infestations, and reducing pesticide use. Companies like PEAT (Germany) use AI-powered mobile applications to detect crop diseases via image recognition. AI facilitates *precision agriculture*, a data-driven approach to farming that increases productivity while minimizing environmental harm. AI models can analyze weather forecasts, satellite images, and soil health data to guide farmers on optimal planting times, irrigation schedules, and fertilization. It can also detect *pest infestations* or *crop diseases* early using image recognition apps. A leading example is *PEAT (Plantix)*, a German startup that offers AI-driven mobile tools to diagnose plant diseases from smartphone photos. This helps farmers use fewer chemical inputs, conserve water, and boost sustainable yields.

Legal Dimensions of AI and the Environment

- **Environmental Law Overview**

Environmental law includes statutes, regulations, treaties, and case law that address environmental protection. These laws are largely reactive, focusing on pollution control, conservation, and resource management. Environmental law refers to the body of rules, policies, statutes, and case laws that govern how humans interact with the natural environment. It covers areas like pollution control, waste management, wildlife protection, water and air quality standards, and forest conservation. International treaties (e.g., the Paris Agreement), national legislation (like India's Environment (Protection) Act, 1986), and judicial pronouncements shape this field. Notably, environmental law has traditionally been **reactive**—responding to

harm after it occurs rather than proactive. It is now being challenged to evolve as technologies like AI provide real-time capabilities for monitoring and prevention.

- **AI and Environmental Regulatory Compliance**

AI offers powerful tools to strengthen environmental compliance mechanisms. It enhances the enforcement of regulations by:

- **Monitoring air and water quality in real time** through sensors and AI-powered IoT networks.
- **Predicting violations** by using historical data to identify trends or anomalies that may suggest future breaches in emission or discharge limits.
- **Automating alerts and reports** to regulatory bodies, enabling quicker responses to violations.

For example, AI can analyze satellite images to detect **unauthorized emissions** from industrial units or **unlawful land use**, helping regulators intervene quickly.

- **Challenges in Existing Legal Frameworks**

Current environmental and AI laws are **not fully equipped** to handle the hybrid challenges posed by AI-driven environmental governance. Key concerns include:

- **Accountability:** If an AI system causes environmental harm (e.g., faulty sensor misreads leading to toxic discharge), is the liability on the developer, user, or AI itself?
- **Transparency:** Many AI systems are "black boxes" whose decision-making processes are opaque, making it difficult for courts or regulators to understand or trust them.
- **Jurisdiction:** AI tools often operate across borders (e.g., satellites monitoring global deforestation), raising questions about which legal system applies and how enforcement can be coordinated internationally.

- **Legal Personhood and AI**

Should AI be granted a form of legal personhood? This is controversial, especially when AI systems act independently in environmental monitoring or enforcement. This controversial idea questions whether **AI should be granted legal status** akin to that of a person or a corporation. If AI can operate independently, take environmental actions, or even enforce regulations (e.g., issuing warnings or collecting fines), should it be assigned rights and responsibilities? Critiques argue that AI lacks consciousness or moral agency, making legal personhood inappropriate.

Supporters claim that a form of limited legal status could help clarify **liability and accountability** in AI-led environmental interventions.

- **International Environmental Law and AI**

Instruments like the Paris Agreement and the Convention on Biological Diversity could integrate AI-driven data and enforcement tools. However, lack of uniform standards for AI remains a barrier to global application. Global environmental frameworks like the **Paris Agreement** (on climate change) or the **Convention on Biological Diversity** rely on consistent, verifiable data and monitoring. AI could significantly enhance these processes through better data collection, modeling, and compliance tracking. However, a major hurdle is the **lack of international standards for AI use**, especially around ethics, data sharing, and privacy. Until these are developed, widespread use of AI in global environmental governance will remain fragmented and uneven.

Ethical and Governance Issues

- **Algorithmic Bias and Environmental Justice**

AI systems may inherit biases from data, affecting decisions about environmental risk assessments. This may disproportionately affect marginalized communities—violating principles of environmental justice. AI systems are only as good as the **data they are trained on**. If this data is incomplete, biased, or skewed, the AI can make unfair or harmful decisions. For example, if an AI system used for environmental planning is trained on urban data but lacks rural or tribal inputs, it might ignore pollution issues in those areas. This can lead to **unequal protection**, where well-off or urban populations benefit from environmental policies, while **marginalized communities are overlooked or harmed**. This violates the principle of **environmental justice**, which says that all people, regardless of income, caste, or location, have the right to a clean and safe environment.

- **Surveillance and Privacy**

Environmental AI often relies on massive data collection, including satellite imagery and smart sensors. This raises questions about consent, surveillance, and data protection, particularly in rural or indigenous regions. Many AI applications in environmental monitoring rely on **large-scale data collection**—like satellite images, drones, smart sensors, and even facial recognition in protected areas. While these tools help monitor pollution or prevent illegal activities, they can also raise serious **privacy concerns**. People living in **rural, remote, or indigenous communities** may not be aware that their land or lifestyle is being observed and recorded. Without clear laws on **data ownership, consent, and ethical use**, AI-based surveillance could become intrusive or even exploitative.

- **AI's Carbon Footprint**

Ironically, AI also consumes large amounts of energy, especially in training large models. Legal frameworks must balance the benefits of AI with its environmental costs. Though AI is used to fight climate change, it has its own **environmental cost**. Training advanced AI models (especially deep learning systems like ChatGPT or image-recognition tools) requires **huge computing power**, which consumes significant electricity—often generated from fossil fuels. For instance, training a large AI model can emit as much carbon as five cars over their lifetime. Therefore, policymakers must **balance the benefits of using AI** to protect the environment with the **energy and emissions costs** involved in developing and operating AI systems. Laws should encourage the use of "**green AI**"—models optimized for energy efficiency.

Regulatory Recommendations and Way Forward

- **Enactment of AI-Specific Environmental Norms**

As AI becomes more involved in environmental protection and regulation, **specific legal provisions** must be created to address new challenges. Key areas include:

- **AI-generated data in litigation:** Courts and tribunals must decide whether data collected or processed by AI (like air pollution readings or satellite images) is **admissible as legal evidence**. This may require amendments in environmental and procedural laws.
- **Liability:** When AI systems act independently—like an autonomous drone misidentifying an area and damaging a habitat—there must be clear rules on **who is responsible**: the developer, operator, or user.
- **Ethical standards:** Uniform **AI ethics frameworks** are needed for environmental use, ensuring transparency, fairness, accountability, and sustainability in all AI applications.

- **Encourage Open Environmental AI Models**

Governments should promote open-access AI tools and environmental datasets to ensure equitable development and research. Many powerful AI tools and environmental datasets are controlled by private companies or governments, limiting access for researchers, smaller countries, and civil society. To promote **equity and transparency**, public agencies should:

- Support **open-access AI models** for climate modeling, pollution tracking, and ecosystem management.
- Release **open environmental data**, allowing scientists and policymakers from all regions to collaborate, innovate, and act on shared climate challenges.

- **Green AI Certifications**

Introduce a certification mechanism for "Green AI" – systems optimized for low energy consumption and environmental benefit. AI systems themselves consume energy and resources, contributing to the carbon footprint. To ensure that AI is **part of the solution, not the problem**, governments and regulatory bodies should:

- Develop a **certification system** for "Green AI," recognizing tools that use **low-energy algorithms**, run on **renewable energy**, and have measurable **environmental benefits**.
- Encourage industries to adopt these standards by offering **incentives or regulatory preferences**.

- **International Legal Collaboration**

A global treaty on AI and the environment could be envisaged under UN auspices to harmonize standards, particularly for climate AI tools and transnational environmental monitoring. Environmental issues are **transboundary**—climate change, air pollution, and biodiversity loss affect all countries. Therefore, there is a growing need for a **global legal framework** to regulate and guide the use of AI in environmental governance. This could include:

- **AUN-led treaty** on "AI and the Environment" that sets standards for transparency, data sharing, ethical deployment, and dispute resolution.
- Shared protocols for using AI tools in **climate modeling**, **disaster forecasting**, and **compliance monitoring** under global agreements like the **Paris Agreement** or **Sustainable Development Goals**.

- **Role of Judiciary**

Courts in various jurisdictions, including India, have already taken a proactive (suo motu) cognizance of environmental violations. They must adapt to admit and assess AI-generated evidence and models with caution. The **judiciary** plays a key role in environmental governance, especially in countries like **India**, where courts have taken proactive action on pollution and ecological harm. As AI-generated data becomes more common in environmental disputes, courts must:

- Be **trained and equipped** to understand and evaluate AI evidence and models.
- Set **judicial standards** for the use of AI in evidence, particularly regarding accuracy, bias, and reliability.
- Ensure that the use of AI does not **compromise constitutional rights**, like the right to privacy or equality before the law.

Conclusion

Artificial Intelligence offers transformative potential to address environmental challenges. However, without robust legal frameworks, its application risks exacerbating inequalities and unintended consequences. A balanced, multi-stakeholder approach—integrating technology, ethics, environmental science, and law is essential for building a sustainable AI future. AI is neither a threat nor a magic bullet, it is a tool. When thoughtfully deployed, it can address some of higher education's biggest challenges: accessibility, quality, and personalization. For teachers, AI offers an opportunity to evolve, to offload administrative burdens, and to rediscover the joy of connecting with learners. But it also demands responsibility to use technology ethically, inclusively, and humanely. The future of higher education will not be man or machine, it will be man with machine. And that partnership has the potential to make education more impactful than ever before.

References

- Central Pollution Control Board. (2023). *Annual report 2022–2023*. Ministry of Environment, Forest and Climate Change, Government of India.
<https://cpcb.nic.in/annual-reports/>
- European Commission. (2021). *Proposal for a regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act)*.
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206>
- Google DeepMind. (n.d.). *Case study on energy efficiency in data centres*.
<https://www.deepmind.com/blog/deepmind-ai-reduces-google-data-centre-cooling-bill>
- Government of India. (1986). *The Environment (Protection) Act, 1986*. Ministry of Law and Justice. <https://legislative.gov.in/sites/default/files/A1986-29.pdf>
- IBM Research. (2020). *Earth observation and wildlife project*.
<https://www.ibm.com/blogs/research/2020/07/ai-wildlife-monitoring/>
- Kakati, B., & Mandal, R. (2022). Legal issues in AI for environmental monitoring. *Indian Journal of Law and Technology*, 18(1), 45–63.
- Nature Sustainability. (2021). AI and the environment. *Nature Sustainability*, 4(3), 189–190. <https://doi.org/10.1038/s41893-021-00670-6>
- Organisation for Economic Co-operation and Development (OECD). (2023). *Artificial intelligence and environmental sustainability*.
<https://www.oecd.org/environment/artificial-intelligence-and-the-environment.htm>
- United Nations. (1992). *United Nations Framework Convention on Climate Change (UNFCCC)*. <https://unfccc.int>
- United Nations. (2015). *Paris Agreement*. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

