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# Environmental Law: Evolution, Principles, and Challenges in a Globalized World

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## ABSTRACT

*Environmental law has emerged as a vital field in the global legal system, aimed at regulating human activities to protect the environment and promote sustainable development. As the scale and complexity of environmental degradation continue to grow—manifesting in climate change, deforestation, air and water pollution, and biodiversity loss—legal instruments have become indispensable in managing the interface between human development and ecological preservation. This abstract provides a comprehensive overview of the evolution, foundational principles, key international and national frameworks, and major challenges within environmental law. It also presents strategic directions for future legal development and governance.*

*Historically, environmental law has its roots in traditional customs and early legal codes that sought to manage natural resources such as forests, water, and fisheries. However, the modern discipline of environmental law developed in the latter half of the 20th century, particularly following the environmental movements of the 1960s and 1970s. Notable milestones in this development include the enactment of the United States' National Environmental Policy Act (NEPA) in 1969, the establishment of the United Nations Environment Programme (UNEP) following the Stockholm Conference in 1972, and the Earth Summit in Rio de Janeiro in 1992. These events catalyzed the adoption of major international treaties, such as the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and Agenda 21, which laid the groundwork for global environmental governance.*

*Environmental law is built upon several universally accepted legal principles that inform policy design and enforcement. The precautionary principle advocates for proactive action to prevent environmental harm, even in the absence of complete scientific certainty. This principle has become particularly important in addressing emerging risks like climate change, nanotechnology, and genetically modified organisms. The polluter pays principle assigns responsibility to those who cause environmental harm, requiring them to bear the financial costs of pollution control and damage remediation. Sustainable development serves as the guiding vision for environmental law, promoting the integration of environmental, social, and economic considerations in policymaking. Another cornerstone principle is public participation, which emphasizes the rights of individuals*

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*and communities to access environmental information, participate in decision-making, and seek judicial remedies for environmental harm. Together, these principles form the ethical and functional basis of contemporary environmental law.*

*Environmental law also faces several pressing challenges in the modern era. Climate change, arguably the most urgent global issue, has exposed the inadequacy of existing legal systems to enforce mitigation and adaptation goals. Corporate environmental accountability remains difficult to ensure, especially when multinational companies operate across borders and exploit regulatory loopholes. Environmental injustice persists, as marginalized communities frequently bear a disproportionate share of environmental harm while having the least access to legal remedies. Additionally, conflicts between traditional legal systems, national legislation, and international norms—especially in indigenous and rural regions—can create legal pluralism that complicates enforcement.*

**Keywords:** *Environmental Law, Climate Change, Environmental Protection, Judicial Activism, Governmental Organisations.*

## I. INTRODUCTION

Environmental law is a set of rules and regulations created to protect the natural environment and manage the way people interact with nature. These laws help control pollution, manage natural resources, and make sure that we use land, water, air, and other environmental resources responsibly. Environmental law is important because it helps us live in a cleaner, safer world and ensures that future generations will also be able to enjoy nature. Without environmental laws, industries, governments, and even individuals could harm the environment in ways that could be difficult or impossible to fix.

In the past, people did not always think about the long-term effects of their actions on the environment. As countries grew and developed, forests were cut down, rivers became polluted, and air quality got worse. People began to notice problems like smog, water shortages, toxic waste, and endangered animals. These problems made it clear that something had to be done. One turning point was in the 1960s and 70s, when environmental disasters—like oil spills and chemical leaks—caused serious harm to people and nature. Books like *Silent Spring* by Rachel Carson warned about the dangers of using pesticides and chemicals. These events and ideas helped raise awareness and pushed governments to create laws to protect the environment.

As environmental problems became more serious, countries realized that some issues could not be solved by one country alone. Problems like climate change, ocean pollution, and the

extinction of animals affect the whole planet. This led to the creation of international environmental agreements, where many countries agree to work together. For example, the Paris Agreement, signed in 2015, is a global deal to reduce the pollution that causes climate change. Each country that joins the agreement promises to take action to reduce carbon emissions. Other agreements, like the Convention on Biological Diversity and the CITES treaty, aim to protect wildlife and ecosystems across borders.

While environmental laws exist in most countries, following them is not always easy. In many places, environmental laws are not properly enforced. This means that even if a law exists to stop pollution, companies or individuals may break the rules without being punished. Sometimes, governments may not have enough money or staff to monitor every factory or project. In other cases, powerful companies may ignore the rules because they know they can avoid penalties. Corruption, lack of education, and political pressure also make it hard to enforce environmental laws. As a result, pollution continues, forests are cut down illegally, and water is wasted or poisoned.

## **II. INTERNATIONAL ENVIRONMENTAL LAW**

International environmental law consists of treaties, agreements, and customary legal principles developed to address transboundary and global environmental issues. Key frameworks include:

### **a. Kyoto Protocol (1997):**

First international treaty to impose binding greenhouse gas emission reduction targets, mainly on developed nations.

The Kyoto Protocol is an international treaty adopted on December 11, 1997, in Kyoto, Japan, under the framework of the United Nations Framework Convention on Climate Change (UNFCCC). It was the first major international agreement that legally bound developed countries to reduce their greenhouse gas (GHG) emissions in an effort to combat global warming and climate change. The protocol officially entered into force on February 16, 2005, after it was ratified by a sufficient number of countries.

### **b. Paris Agreement (2015):**

A universal accord under the UNFCCC where all countries voluntarily set national targets (NDCs) to limit global warming to below 2°C, ideally 1.5°C. Unlike the Kyoto Protocol, it includes both developed and developing nations.

### **c. Convention on Biological Diversity (CBD):**

Aims to conserve biodiversity, promote sustainable use of ecosystems, and ensure equitable sharing of genetic resources.

### III. CONTEMPORARY CHALLENGES AND EMERGING TRENDS

Environmental law, while significantly developed over the past decades, faces unprecedented challenges in the contemporary world. The accelerating pace of climate change, increasing globalization, and the intersection of environmental concerns with human rights and social justice have transformed environmental governance. This section examines the key challenges facing environmental law today and highlights emerging trends that are shaping its future trajectory.

#### Climate Change Litigation and Environmental Justice

One of the most urgent contemporary challenges is climate change. Legal systems worldwide are increasingly confronted with cases demanding government accountability for climate action and corporate responsibility for emissions.

- **Climate Litigation:**

Courts have become critical arenas where citizens, NGOs, and even states press for more ambitious climate policies. Climate litigation targets include governments failing to meet emission reduction commitments and corporations accused of contributing significantly to greenhouse gas emissions. Notable cases include the Dutch *Urgenda* case, where the government was ordered to cut emissions by at least 25% by 2020 compared to 1990 levels, and *Juliana v. United States*, where youth plaintiffs argued for governmental action to safeguard their future.

- **Environmental Justice:**

Environmental harms disproportionately affect marginalized and vulnerable communities, exacerbating social inequalities. Environmental justice seeks to address this by ensuring equitable distribution of environmental benefits and burdens, and by promoting participation of affected communities in environmental decision-making. This trend challenges traditional environmental law to incorporate social and economic dimensions alongside ecological concerns.

#### Globalization and Transboundary Environmental Harm

Environmental issues increasingly transcend national borders due to globalization, requiring cooperative international responses.

- **Transboundary Pollution:**

Air and water pollution, hazardous waste disposal, and biodiversity loss often affect multiple countries, complicating enforcement and regulatory jurisdiction. For example, industrial pollutants emitted in one country may cause acid rain in another, necessitating cross-border legal frameworks like the Convention on Long-Range Transboundary Air Pollution.

- **International Trade and Environment:**

The relationship between environmental regulation and international trade presents tensions. Trade agreements may limit national governments' ability to implement stringent environmental laws if such measures are seen as barriers to trade. The challenge lies in harmonizing trade policies with environmental protection without compromising either.

### **Role of Technology and Data in Environmental Regulation**

Technological advancements and data analytics are transforming environmental monitoring and enforcement.

- **Remote Sensing and Satellite Monitoring:**

These technologies enable real-time tracking of deforestation, pollution, and climate-related changes, enhancing transparency and accountability.

- **Big Data and AI:**

Artificial intelligence and data analytics facilitate the prediction of environmental risks, optimize resource management, and detect non-compliance.

- **Digital Public Participation:**

Technology enables broader public engagement in environmental decision-making through digital platforms, crowdsourced data, and social media advocacy.

## **IV. CHALLENGES IN ENFORCEMENT AND COMPLIANCE**

Despite growing legal frameworks and technological tools, enforcement remains a persistent challenge.

- **Resource Constraints:** Many regulatory agencies face limited funding, manpower, and technical expertise to effectively monitor and enforce environmental laws.
- **Political and Economic Pressures:** Governments may prioritize economic development or political interests over strict environmental enforcement, leading to regulatory rollbacks or lax implementation.

- **Corruption and Weak Governance:** Corruption can undermine regulatory agencies and create loopholes for environmental violations.
- **Complexity of Environmental Problems:** Issues like climate change and biodiversity loss are complex, requiring coordinated multi-sectoral approaches that traditional legal mechanisms may struggle to address effectively.

## **V. ROLE OF GOVERNMENTAL AND NON-GOVERNMENTAL ORGANIZATIONS IN ENVIRONMENTAL LAW**

**Governmental Organizations** play a central role in environmental law by developing, implementing, and enforcing legal frameworks aimed at protecting the environment. They enact laws and regulations, monitor pollution and resource use, issue permits, and impose penalties for non-compliance. National governments also represent their countries in international environmental agreements such as the Paris Agreement, coordinating efforts to tackle global issues like climate change. Local governments are crucial in applying environmental policies at the community level, dealing with issues such as waste management and land-use planning.

Governments formulate and enact environmental statutes that set standards for pollution control, natural resource management, biodiversity conservation, and climate change mitigation. Legislative bodies (parliaments, congresses) deliberate and pass these laws, while executive agencies design regulations and guidelines for their implementation.

Governments represent their countries in negotiating and ratifying international treaties such as the Paris Agreement, the Convention on Biological Diversity, and the Basel Convention. These global agreements require domestic incorporation and enforcement, tasks which governments oversee.

**Non-Governmental Organizations (NGOs)** complement these efforts by advocating for stronger environmental protections and raising public awareness about environmental issues. NGOs often act as watchdogs, monitoring pollution and government actions, and they use litigation to hold corporations and governments accountable for environmental harm. They also engage communities by providing education and empowering them to participate in environmental decision-making. Additionally, NGOs frequently implement innovative projects related to conservation, renewable energy, and sustainable development, often serving as pilots for larger government programs.

NGOs raise awareness about environmental issues, mobilize public opinion, and lobby

policymakers for stronger protections. Campaigns on climate change, pollution control, and wildlife conservation often originate or are amplified by NGOs.

NGOs work closely with local and indigenous communities, empowering them to assert their environmental rights and participate meaningfully in decision-making processes. This bottom-up approach helps ensure that environmental governance is inclusive and equitable.

## **VI. JUDICIAL ACTIVISM AND LANDMARK CASES IN ENVIRONMENTAL LAW**

### **Judicial Activism in Environmental Law**

Judicial activism has emerged as a pivotal force in the development and enforcement of environmental law worldwide. It describes the proactive stance taken by courts to interpret, expand, and sometimes create legal principles to address pressing environmental challenges, especially in situations where legislative and executive bodies have failed to act decisively. Unlike traditional judicial restraint, where courts limit themselves to applying laws as written, judicial activism in the environmental context involves courts stepping into the policy arena, often employing broad interpretations of constitutional and statutory provisions to protect the environment and public health. This activism has been driven largely by the recognition that environmental degradation directly impacts fundamental human rights such as the right to life, health, and dignity, prompting courts to expand the scope of these rights to include environmental protection.

One of the key foundations of judicial activism in environmental law is the reinterpretation of fundamental rights enshrined in constitutions. Courts have increasingly held that a clean and healthy environment is essential to the right to life, which is protected under many national constitutions and international human rights instruments. This judicial approach effectively elevates environmental protection to a constitutional mandate, compelling governments to take preventive and corrective measures against pollution, deforestation, and other environmental harms. For instance, courts have often used this interpretation to justify orders for the closure of polluting industries, the implementation of stricter environmental standards, and the enforcement of remediation efforts. This expansion of rights has been especially significant in countries with Public Interest Litigation (PIL) mechanisms, where courts have become accessible forums for citizens and NGOs to seek justice for environmental harm.

Judicial activism has also been characterized by the innovative use of procedural tools, notably Public Interest Litigation. PIL has transformed environmental jurisprudence by lowering the threshold for standing, allowing concerned individuals, groups, or NGOs to file cases on behalf of the public interest even if they are not directly affected by the



environmental harm. This procedural innovation has democratized access to justice and enabled courts to address systemic environmental issues such as illegal logging, water pollution, and urban air quality deterioration. Through PIL, courts have issued binding directives and monitoring orders to ensure compliance with environmental norms, often instituting oversight committees to supervise implementation. This proactive judicial oversight bridges the gap between law and enforcement, which is frequently deficient due to administrative inefficiencies or political reluctance.

The impact of judicial activism in environmental law is profound. It has compelled governments worldwide to enhance environmental governance frameworks, adopt stricter pollution control standards, and recognize environmental protection as a core element of sustainable development. Activist courts have been instrumental in mandating Environmental Impact Assessments (EIAs) before project approvals, thereby institutionalizing environmental considerations in developmental planning. Moreover, judicial rulings have frequently emphasized the importance of public participation, transparency, and accountability in environmental decision-making, reinforcing democratic governance. The activism of courts has also pressured corporations to adopt cleaner technologies and engage in responsible environmental management, thereby influencing private sector behavior.

## **Landmark Cases in Environmental Law**

### **1. MC Mehta v. Union of India (1986) — India**

One of the most famous cases demonstrating judicial activism, the Supreme Court of India took a strong stance on environmental protection. This Public Interest Litigation (PIL) addressed pollution caused by the industries along the Ganges River. The Court ordered the closure of hazardous industries in the Taj Trapezium Zone and mandated stricter pollution control measures, underscoring the right to a clean environment as part of the fundamental right to life under Article 21 of the Indian Constitution.

### **2. Urgenda Foundation v. State of the Netherlands (2015) — Netherlands**

In this groundbreaking climate change litigation, the Dutch Supreme Court upheld a ruling that ordered the government to reduce greenhouse gas emissions by at least 25% by 2020 relative to 1990 levels. The Court reasoned that the government had a duty of care to protect its citizens from the dangerous effects of climate change. This case set a global precedent for holding states legally accountable for inadequate climate action.

### **3. Massachusetts v. Environmental Protection Agency (2007) — United States**

The U.S. Supreme Court ruled that the Environmental Protection Agency (EPA) has the authority to regulate greenhouse gases as pollutants under the Clean Air Act. The decision recognized the serious threat of climate change and paved the way for federal regulation of carbon emissions, marking a significant shift in U.S. environmental policy.

### **4. Lliuya v. RWE AG (2015) — Germany**

This case involved a Peruvian farmer suing a German energy company, RWE, for contributing to climate change, which allegedly increased the risk of floods threatening his home. While the case is ongoing, it is significant as it tests corporate liability for transboundary environmental harm linked to climate change, illustrating the expanding scope of environmental litigation.

### **5. Minors Oposa v. Factoran (1993) — Philippines**

The Philippine Supreme Court recognized the doctrine of intergenerational equity, affirming that current generations have the responsibility to protect the environment for future generations. This case involved a group of minors filing a suit to stop the government from allowing widespread deforestation, establishing a precedent for environmental rights activism by youth and future generations.

## **VII. CONCLUSION**

In conclusion, environmental law constitutes a critical framework that governs the protection, conservation, and sustainable management of the natural environment. It is an evolving and multifaceted body of law designed to address a wide array of environmental challenges, ranging from pollution control and natural resource management to biodiversity conservation and climate change mitigation. The significance of environmental law lies in its capacity to regulate human activities that adversely affect ecological balance and public health, thereby safeguarding the planet's ecosystems for current and future generations. Through international treaties, national statutes, regulatory policies, and judicial decisions, environmental law harmonizes diverse interests—economic development, social equity, and environmental sustainability—ensuring that these goals are pursued in an integrated manner.

The effectiveness of environmental law depends heavily on the commitment of governments to enact robust legislation, enforce regulatory standards, and promote transparency and public participation. Equally important is the active role of non-governmental organizations, communities, and the private sector in advocating for environmental justice and implementing

sustainable practices. Judicial activism has emerged as a powerful catalyst in this field, filling governance gaps by interpreting legal principles expansively and holding governments and corporations accountable for environmental harm. Moreover, emerging concepts such as the precautionary principle, polluter pays, and intergenerational equity reflect the dynamic nature of environmental law, emphasizing prevention, responsibility, and fairness.

Despite significant progress, environmental law faces numerous challenges, including fragmented regulations, insufficient enforcement, and the increasing complexity of global environmental problems like climate change and biodiversity loss. Addressing these challenges requires ongoing legal innovation, interdisciplinary collaboration, and stronger international cooperation. Environmental law must continue to evolve in response to scientific developments, technological advancements, and shifting socio-political contexts, all while ensuring inclusivity and respect for human rights.

Ultimately, environmental law is indispensable in balancing the urgent demands of economic growth with the imperative of ecological preservation. It embodies society's collective commitment to protect the environment, promote sustainable development, and ensure the well-being of both present and future generations. Strengthening environmental legal frameworks and fostering cooperation across all levels of governance are essential to overcoming environmental crises and achieving a resilient and sustainable global future.

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