



## Biodiversity Conservation and Environmental Jurisprudence: Emerging Trends in Ecological Governance

Dr. Umesh Kumar<sup>1</sup>; Dr. Aprajita Singh<sup>2</sup>, Dr. Shibayan Chattopadhyay<sup>3</sup>, Navneet Yadav<sup>4</sup>, Dr. Indra Daman Tiwari<sup>5</sup>, Dr. Pratiksha Bhardwaj<sup>6</sup>, Dr. Megha Garg<sup>7</sup>

### Abstract

The paper discusses the development of the normative approaches and reveals the movement of the paradigm from passive to active management of biological diversity through the lens of litigation. This shift also highlights the fact that traditional policy tools are often ineffective at addressing some of the underlying drivers of extinctions, including habitat destruction and ecosystem instability caused by climate change. So, from providing site specific protections, judicial action has moved towards the systemic approach done through litigation for providing the various causes contributing to ecological degradation. Moreover, this paradigm transition is defined by the emergence of rights-of-nature movements and ecological constitutionalism, which are an attack on anthropocentric laws that aim to put intrinsic value into governance systems. Such incorporation of biocentric norms calls for a transformative shift towards “Biophilic Constitutionalism” that aims to properly accord nature legal personality through innovative institutional mechanisms such as “Guardians for Nature”. At the same time, the incorporation of cutting-edge technology like AI and blockchain to automatically monitor and enforce laws presents opportunities to further improve the accuracy of data collection under the new laws. In addition to these technological innovations, the judiciary has also been playing an important role in adopting the use of rights litigation as a new tool to address the deficient enforcement of patchy international agreements.

<sup>1</sup>School of Law, Bahra University, Wagnaghat, Solan, Himachal Pradesh. [dr.umesh333@gmail.com](mailto:dr.umesh333@gmail.com)

<sup>2</sup>Associate Professor, School of Law, UPES, Dehradun. [Aprajita.singh@ddn.upes.ac.in](mailto:Aprajita.singh@ddn.upes.ac.in)

<sup>3</sup>Assistant Professor of Law, School of Legal Studies, Seacom Skills University. [shivayan.ssu@gmail.com](mailto:shivayan.ssu@gmail.com)

<sup>4</sup>Legal Consultant, Law Commission of India Research Scholar, Faculty of Law, Maharaja Surajmal Brij University, Kumher, Bharatpur. [yadav.navneet4rights@gmail.com](mailto:yadav.navneet4rights@gmail.com)

<sup>5</sup>Assistant Professor, School of Law, T.S. Mishra University, Lucknow. [shivatiwari.lu@gmail.com](mailto:shivatiwari.lu@gmail.com)

<sup>6</sup>Assistant Professor (Senior Scale), SOL, UPES, Dehradun. [Pkpratikshu@gmail.com](mailto:Pkpratikshu@gmail.com)

<sup>7</sup>Associate Professor, School of Legal Studies, K.R. Mangalam University. [megha.garg@krmangalam.edu.in](mailto:megha.garg@krmangalam.edu.in)

\*Corresponding author

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## **Introduction**

Given the accelerating trends of anthropogenic threats to the global ecology, environmental jurisprudence has to shift from the numerous fragmented directives in environmental regulation towards more autonomous and scientifically informed governance. This shift is a sign of increasing awareness that current laws are falling short of passively protecting nature and need to actively integrate adaptive and ecosystem-based approaches to tackle the links and interdependency between climate change and habitat degradation. More specifically, to drive the transition away from traditional species-level protection frameworks to other more comprehensive approaches like stewardship programs, restoration requirements, and formal offsets to guarantee long-term ecological sustainability. The trend towards adaptive law responds to research gaps in national and regional policies and the need to align different areas of regulation to address the growing convulsive impacts of environmental change. Beyond this, current legislation is dominated by the interests of static property rights and in the past by range stability, which contributes to a systemic inertia that does not acknowledge species migratory behaviour and the formation of new ecosystems. To this end, it is necessary that laws and regulations need to be adapted to include managed species redistributions and risk assessment beyond national borders. As such, scholars contend that using the potential of current legal frameworks and not waiting for a comprehensive change of the system is more of a pragmatic route towards promoting social-ecological resilience. Those pragmatic approaches require ecosystem-based management and for the first time, a recognition of the rights of nature to promote pro-active, and not just reactive, governance [1]. Further, any attempt to carry out the needed adjustments to current system gaps have to face the anthropocentric shift and regulatory fragmentation inherent in modern TEL. To fill this void, legal frameworks need to recognize the need for iterative feedback loops and thresholds for recalibration as knowledge of what complex social-ecological systems are doing is updated through monitoring. Yet, there are many institutional obstacles: prevailing legal doctrine may mistakenly view ecological phenomena as linear, thus missing the non-linear, critical thresholds, which are extremely important to effectively manage linked socio-ecological systems.

## **Ecological Governance Frameworks**

Implementing resilience-based governance involves fundamentally restructuring administrative law in order to enable information flows across scales and embed institutions into a legitimate setting. This operationalisation of reflexive law principles can help agencies to shift away from strictly command-and-control approach and implement adaptive mechanisms that can address the non-linear dynamics of social-ecological systems. To achieve this integration it would be necessary to close the fundamental divide between the legal and the ecological worlds, between precision and outcome, and accept the possibility of scientific uncertainty in legally mandated actions [2]. Moreover, law scholars propose the use of quantifiable resilience measures to minimize spatiotemporal mismatches in restoration efforts and make sure that they are sensitive to changing population dynamics. However these must also take into consideration the validity of administrative discretion, namely that the delegation of flexibility to resource managers is kept transparent and accountable to society. Further, this transformation needs to include the reconfiguration of the legal system to integrate the normative aspects of resilience, reconnecting the rights and obligations of people and the responsibilities of the public to the dynamic content of sustainable ecosystem states. Ultimately they depend on a process of incremental legal change permitting stakeholder engagement in an iterative process of knowledge generation, thus building the collaborative capacity needed to deal with complex, non-linear socio-ecological interactions. In this regard, there is growing demand for adaptive governance that has come to equate legal “governance” with social and ecological resilience; for discarding hierarchical, top-down governance in favour of polycentricity and self-organising governance [3]. This bottom-up approach recognizes that

adaptive capacity may develop in a spontaneous manner through innovation and political discourse from various points of activity. Their combining, namely with resilience, is an effective way to reconcile the opposing bases of science experimentation and the need of society for governance stability of its administrative systems. A synthesis of this kind cannot be achieved, unless the administrative law is rethought on how to better embed these size-appropriate feedbacks, without also hampering the learning processes crucial for sustainability [4].

### **Legal Recognition Rights**

The "rights of nature" discussion today aims to overcome the anthropocentric law-making approach by granting legal standing to ecosystems, non-human animals and other elements of nature, and crafting legal protections to reflect the complexity of ecological webs. This paradigm change fundamentally reshapes and reconfigures the judiciary's role from being an arbiter between competing claims of humans to being an institutional protector of the integrity of the ecosystem. The commissioning of legal personality on the basis of the functional necessity of environmental processes is an important instrument to help build a framework reflecting the transboundary effects of climate change-induced ecosystem degradation in a better way. In addition, embedding points of procedural fairness in these recognitions expands the bases on which decisions are made, better capturing the socio-ecological processes that are important to institutional and environmental resilience [5], [6]. This incorporation of different knowledge claims and non-human interests requires the development of deliberative fora that will enable multiple stakeholders to be involved in continuous monitoring and reviewing procedures. Thus, the law can help give the necessary tools to monitor these complex systems, while allowing flexibility in response to feedback received. This requires a step toward reflexive mechanisms of multi-scalar knowledge sharing, thus not restricting the degree of potential procedural innovations formulated and implemented on the local or regional scale by means of federal level instructions. Laws can then incorporate these deliberative processes, allowing governance systems to at least somewhat overcome the generic and universal aspects of existing laws and the unique and highly variable needs of ecological situations at the local level. This transition to Earth system law and governance highlights the need for institutional approaches that can address the dynamics and complexity of often non-linear interactions, as well as require anticipatory action at institutional and governance levels [7]. This new legal imaginary argues for social-ecological justice and an alternative imagination that takes into consideration the interests of the non-human world, future generations, and marginalized populations, and lets go of anthropocentric sensations of western property right. Such a legal evolution will allow, if necessary, to place non-human interests over human preferences, which will move the constitutive out of the classic description of an economy as a means for economic development. To conclude, the emergence of legal philosophies and social movements such as the "rights of nature" offer important avenues for making these plural and multispecies justice ideas institutional. Additionally, this shift will involve challenging the state-centric logic in favor of more polycentric forms of governance, which will help take into account the governance voids created by traditional legal systems, especially the use of informal institutions. Polycentric governance is conducive to bridging the different types of claims to knowledge, making sure that local opinion on ecological knowledge is incorporated in the policy instruments, and reducing the risk of blueprint (top-down) solutions. Accordingly, it is clear that this transition to Earth system law needs to be one that views, simultaneously, ecological degradations as well as socioeconomic inequalities, since with what are the modern global systems we interact in multifaceted [8].

### **Jurisprudential Biodiversity Shifts**

This shift is from a purely procedural shift in environmental legislation to a jurisprudential (substantive) turn towards biological integrity as a guarantor goal of the law. Such a change requires more focus on ecological and equity issues to enable ecocentric and compassionate sustainable development, instead of on short-term profit. This kind of paradigm shift hinges on the surrendering of ideas that necessarily assume linear and predictable environmental management, and the use of models which actively expect biophysical and social-political thresholds.

### **Judicial Activism Trends**

Courts are no longer content with employing the anthropocentric, traditional concepts and are actively embracing today multispecies justice and restorative theory, thought and methods in challenging the exploitative nature of historical appropriation of resources. Such court rules, which grant legal personality to unique bioregions, are essentially institutional approaches to introduce legal supports for preemptive measures against a loss of biophysical phase. These new legal and precedents also highlight the importance of a critical, constitutional shift that embraces ecofeminist and posthumanist challenges to questioning binary oppositions and relations between human societies and non-humans. Such a reorientation entails a fundamental shift in ontological and epistemological assumptions from reducing the legal focus to “the environment”, and broadening to recognise the earth system as the primary realm of legal concern, and as a global system that can be found around the world. This concept goes hand-in-hand with a conceptual turn within the epistemic architecture of international law, which no longer looks into climate science and socio-ecological risk assessments as external sources of evidence, but as a central dimension of international law [9].

### **Precautionary Principle Application**

Current use of this principle is evolving from a reactive one to a proactive and substantive one, which is now obligating decision-makers to consider playing with long term tipping points and ecological thresholds. This development is complemented by plans to include in the Rome Statute the crime of ecocide that would render an international judicial instrument to prosecute extreme environmental destruction as a crime analogous to genocide. Moreover, incorporation of the above mentioned legality implies the adoption of the new concept of climate impact “stress testing” for corporate bodies, which demands justifying of financial approaches to uncertain and long-term environmental effects. There is growing support for the adoption of such governance strategies, and platforms such as the Eco Jurisprudence Monitor document the spread of rights-based approaches across various jurisdictions, which could coalesce into a common approach to protecting BI. In addition to these institutional bodies, scholars have been increasingly pushing the ecosystem approach as a unique approach that values local cultural processes and infuses them with scientific tools. Furthermore, decodified human rights law offers a solid basis for this precautionary obligation, because human rights, by their nature, must include the right to protection from the irreversible destruction of nature including biodiversity losses[10].

### **Emerging Governance Challenges**

Anthropocene ecological crisis is one primary tension that is the lack of fit between the non-linear, unpredictable character of Anthropocene ecological crisis, and the relatively fixed, procedural frame of current governance institutions. To overcome this disconnect, scholars propose new ways of conceptualizing courts as "Anthropocene institutions" that are able to cope with the complex and interdependent requirements of earth system law, instead of being trapped in legacy paradigms. In order to create and achieve this structural change, adaptive management solutions must be embedded in the legal frameworks which enable the law to be proactive in the face of new knowledge and new risks (such as geo-engineering and ocean fertilisation). In addition, ongoing research has identified the need to essentialize and rescale legal approaches to bring them closer in line with the Planetary Boundaries framework, taking into account the biophysical limits for different ecosystems and the need for responsive governance. The transition is, however, more difficult because of the current state-centric approach of International Law, which offers little space for the myriad of non-state actors needed to govern the interaction in coupled human-ecological systems.

### **Regulatory Compliance Gaps**

Despite the alignment of international environmental obligations and domestic implementation mechanisms, the efficacy of the environmental conservation is severely undermined by a persistent

disconnect that aims at short-term industrial interests in detriment to long-term ecological stability, especially for States that promote conservation efforts. Moreover, this regulatory fragmentation is compounded by gaps in financial capacity and confusing sense of interpretation that make the implementation of the global norms on the national level more difficult. In order to address these challenges, experts stress the need for transdisciplinary work, so that science-based evidence can be effectively used by the decision-makers at the local level. A re-thinking of the nature of law as a regulatory tool is required to facilitate this transition to understand how law can shift from its rigid state-centric models to a more dynamic tool that can govern complex and interdependent earth system dynamic and processes, instead of focusing on the state-centric institutions of the Holocene. The evolution requires breaking with the linear, path dependent forms that have to date defined global environmental governance, and the development of institutional frameworks that are able to deal with the telecoupled realities of the Anthropocene. This requires a shift away from existing existing silos of work on 'planetary nexus governance', marking an explicit focus on how interconnected Earth system dimensions should be governed rather than on a set of independent governance authorities of each dimension of the Earth system. However, existing international conventions such as UNFCCC and CBD are still formulating their policies in a silo mentality fashion, which puts the interests of the states at stake [11].

### **Institutional Barriers**

Institutions are restricted, more or less, to their design in the Holocene era, which is based on linear, determinants causal relations, whereas the Anthropocene is of a highly complex, non-linear nature with multiple decentering feedbacks active. They are often inflexible and tend to separate conservation concerns from economic and social concerns, which is detrimental to the systemic nature of the problem that is necessary for effective governance. Furthermore, there are entrenched unequal power relations and divergent values related to nature which often hinder the normative shifts required to realise this vision of living in harmony with nature. This paradigm shift a move to Earth system law is then needed to address these systemic gaps to stave off a globally networked system of social-ecological problems. This legal transformation additionally calls for the institutionalisation of planetary stewardship, where rights-based approaches and global ecological citizenship are integrated to shift from mitigation to systemic earth system stabilisation. This implies taking a new view of the role of the state; a state that is active in creating institutions for good practice and which can provide mediation sessions between groups of different levels to ensure that transformative governance initiatives can occur. Building resilience into these new governance structures thus requires building trust in institutions and identifying social values for collaboration that can enable stakeholders to work together across complex and multi-scale governance arrangements [12], [13].

### **Future Policy Directions**

To address these criticisms of institutional ineffectiveness, policy makers should focus on the "nexus" approach, which incorporates policy solutions that are cognizant of this correlation between the climate, water and food system, and policies that are aware of this correlation and attempt to manage the telecoupled global systems are therefore preferable. This shift requires addressing institutional inertia, and spatial/temporal scale disconnects that limit the ability of existing cross-sectoral strategies to yield meaningful Landscape level outcomes. Moreover, the adoption of these systems-based frameworks will need a paradigm shift in mental models to overcome traditional approaches to policy design with a strong tendency to siloing and will allow for approaches to collaborative governance, which appropriate levels of emergency response can consider as multi-sectoral cascades of environmental effects. In addition, these breakthroughs will be accompanied by the operationalization of Environmental Policy Integration, perceived not only as an incremental change in legislation, but as a catalyst for reprioritizing society's goals to turnative and sustainability oriented results. Moreover, to enable true resilience in these socio-ecological systems, problems faced with frequently occurring scale mismatches, such as the mismatch of economic development and management policies, must be addressed. To tackle these systemic challenges, needs explicit

design of integrated frameworks that include planetary boundaries and telecoupling to consider and represent socioeconomic interconnections systematically in institutional design. Further, future governance frameworks will have to incorporate social-behavioral diversity and dynamics in the systemic-models, to properly assess how policy measures might work in response to changing environmental pressures. Last, there is a need to carefully analyze the costs and benefits of applying any of these governance solutions to make sure that they do not arrest improvements in local biodiversity or resilience of ecosystem services.

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