

An Interdisciplinary Study On Constitutionalizing Climate Justice Through Biomedical Innovation

Mridusmita Baruah¹ and Dr Aparajita Baruah*

¹ Research Scholar, Department of Law, Gauhati University.

* Research Guide and Head, Department of Law, Gauhati University.

ABSTRACT

The global legal landscape is witnessing a ‘constitutional turn’ in environmental litigation. As the physical impacts of climate change intensify, litigants are shifting from administrative challenges toward fundamental rights-based claims. Courts across jurisdictions are recognizing a ‘right against climate change’ through doctrines such as the Living Tree, proportionality, and intergenerational equity. At the same time, pharmaceutical sciences are innovating drug delivery systems—nano carriers, inhalable formulations, and sustained-release implants—to mitigate climate-linked health burdens. Through this study, the researcher integrates jurisprudential and biomedical perspectives, arguing that climate justice must extend to drug administration. By combining constitutional principles of fairness, intergenerational responsibility, and ecological sustainability with pharmaceutical innovation, the study proposes a justice-oriented framework for climate-health governance in the Anthropocene(1). It concludes that while the right presents significant challenges to the doctrine of polycentricity, it serves as an essential ‘intertemporal guarantee of freedom’ in the Anthropocene (1,2).

Keywords: Climate Justice; Intergenerational Equity; Polycentricity; Public Trust Doctrine; drug delivery; nanomedicine; public health.

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INTRODUCTION: THE CONSTITUTIONAL TURN

The twenty-first century has inaugurated what scholars increasingly describe as a constitutional turn in climate litigation. Citizens, NGOs, and youth movements have therefore sought recourse in constitutional courts, reframing climate stability not merely as a policy goal but as a fundamental right (1).

Courts in the Netherlands, Germany, and India have reframed climate stability as a fundamental right, while pharmaceutical sciences have developed advanced drug delivery systems to address respiratory, cardiovascular, and vector-borne diseases exacerbated by climate change.

The emergence of a right against climate change represents a paradigmatic move from negative liberties toward positive obligations, where the state is constitutionally bound to secure ecological conditions necessary for human survival. A stable climate is now argued to be a precondition for the enjoyment of all other rights, from health and housing to equality and dignity (2).

OBJECTIVES OF THE RESEARCH STUDY

1. To analyze the Jurisprudential Transition from Positivism to the Living Tree Doctrine stating how constitutional courts shift from a static, positivist interpretation of rights to an evolutionary ‘Living Tree’ approach that encompasses the ecological conditions necessary for survival and evaluate biomedical innovations in drug delivery for climate exacerbated diseases.
2. To evaluate the problem of Polycentricity and Judicial Overreach in managing complex, ‘spider-web’ climate issues that impact energy markets, labor, and international trade, thereby assessing the risk of a ‘Democratic Deficit’. Examine the polycentric challenges common to law and pharma (regulation, supply chains, democratic legitimacy).

email: mridusmitabaruah@gauhati.ac.in

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3. To examine the Intertemporal Guarantee of Freedom of how current judicial decisions safeguard the remaining carbon budget to protect the constitutional rights of younger and future generations.
4. To compare global judicial pathways for climate justice by conducting a comparative study of how different jurisdictions specifically the Netherlands, Germany, and India internalize international human rights and domestic constitutional provisions to recognize an integrated justice-oriented framework for climate health governance.

Significance of the Study

The researcher has highlighted advances of drug delivery technology by situating biomedical innovation within the broader constitutional framework of climate justice. By demonstrating how doctrines such as intergenerational equity, proportionality, and the Living Tree can safeguard pharmaceutical access in climate-vulnerable contexts, the paper bridges legal theory with practical drug delivery challenges. The integration of WHO, FDA, and EMA case studies ensures that the findings are globally relevant, offering IJDDT readers a novel interdisciplinary perspective on how constitutional law can reinforce resilience in pharmaceutical supply chains and equitable access to therapies.

METHODOLOGICAL FRAMEWORK

The researcher has adopted a Qualitative-Jurisprudential Research Design, focusing on the evolution of constitutional norms in response to the climate crisis. This framework is divided into three analytical layers:

1. Doctrinal Analysis: Examining the ‘static’ constitutional text versus the ‘evolutionary’ interpretation provided by the Living Tree Doctrine.
2. Theoretical Critique: Applying Lon Fuller’s Theory of Polycentricity to evaluate the ‘Spider-Web Effect’ of judicial orders on socio-economic systems.
3. Comparative Legal Synthesis: Analyzing the ‘Global Judicial Dialogue’ to identify how different legal systems (Civil Law, Common Law, and Ecocentric systems) internalize climate justice.

The research findings are anchored in the following specific primary and secondary sources:

- i. Constitutional and Statutory Instruments
- ii. Landmark Judicial Precedents
- iii. International Legal and Biomedical Frameworks
- iv. Biomedical regulatory case studies (WHO, FDA, EMA)

RESULTS

Jurisprudential Foundations

The Living Tree Doctrine posits that constitutions are organic instruments that must evolve with societal needs. If life itself is imperiled by rising sea levels, extreme heat, and biodiversity collapse, constitutional interpretation must expand to encompass ecological conditions necessary for survival.

The Living Tree Doctrine and Biomedical Survival

A central pillar of climate jurisprudence is the Living Tree Doctrine, which posits that a constitution must be interpreted in light of evolving social and environmental realities. If the ‘Right to Life’ was drafted in an era before atmospheric carbon reached 420ppm, a ‘living’ interpretation must now include the right to the ecological conditions that make life possible.

In biomedical terms, climate stability is a prerequisite for effective drug delivery systems, as unstable environments compromise therapeutic efficacy and distribution chains.

The Positivist Challenge

Legal positivists, however, resist this elasticity. To discover a right against climate change within general clauses such as ‘life’ or ‘liberty’ risks undermining the Rule of Law (3). Judges, they contend, are not legislators; their role is to apply law, not create it (4).

This tension between positivism and living constitutionalism lies at the heart of climate jurisprudence. The debate underscores the fragile balance between interpretative creativity and fidelity to constitutional text (5).

Judicial Overreach and Polycentricity of the Healthcare Systems

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The most potent critique of constitutionalizing climate justice is the problem of polycentricity, articulated by Lon Fuller. Fuller's spider web effect applies not only to energy and trade but also to pharmaceutical supply chains (6). Judicial climate mandates ripple across logistics, cold-chain storage, and access to essential medicines, underscoring the intersection between constitutional climate rights and biomedical delivery.

The Spider-Web Effect

Climate change is not a discrete legal issue; it is a global problem. Courts are limited to the evidence presented by the parties before them (11). Fuller's concept highlights the interconnected nature of complex problems (6,7).

Counter-Majoritarian Difficulty

When an unelected judiciary sets a national carbon budget, it risks a democratic deficit (8). Alexander Bickel's counter-majoritarian difficulty resurfaces in climate litigation (9). When unelected judges impose national carbon budgets, they risk insulating fundamental economic choices from democratic debate (10).

Comparative Jurisprudential Analysis

The constitutionalisation of climate justice has not occurred in isolation. Courts across jurisdictions are engaged in what Anne-Marie Slaughter once termed a 'global judicial dialogue'—a transnational borrowing of reasoning, doctrines, and interpretative strategies.

DISCUSSION

Landmark rulings on Climate justice

The Dutch Supreme Court's decision in *State of the Netherlands v Urgenda Foundation* is widely regarded as the first landmark case to constitutionalize climate obligations (12). The Court held that the Netherlands was required to reduce greenhouse gas emissions by at least 25% by 2020 compared to 1990 levels. The jurisprudential significance of *Urgenda* lies in its reliance on the Common Ground Doctrine. By interpreting international human rights obligations as part of the domestic constitutional fabric, the Court effectively 'internalised' global climate commitments(13).

In 2021, the German Federal Constitutional Court delivered its landmark ruling in *Neubauer v Germany*, introducing the concept of the intertemporal guarantee of freedom(14). In *M.K. Ranjitsinh v Union of India*, the Supreme Court explicitly recognized a right against the adverse effects of climate change, linking it to Articles 14 and 21 (15).

WHO Case Studies

- i. COP26 Case Studies on Climate Change and Health (2020): Highlighted five priority areas—adaptation, energy transitions, nature, clean transport, and finance—showing how climate change directly affects public health systems and drug distribution resilience(16).
- ii. WHO Case Study Series (2022): Documented national and sub-national initiatives to reduce climate impacts on health, including climate-resilient health systems and low-carbon pharmaceutical supply chains(17).
- iii. Climate Services for Health (2016): Provided case studies on integrating climate data into public health decision-making, relevant for anticipating drug demand during climate-driven disease outbreaks (18).

US FDA Case Studies

- i. FDA and Neglected Tropical Diseases (2024): Climate change is expanding the range of tropical diseases (e.g., dengue, chikungunya, leishmaniasis). FDA reports emphasize the need for renewed focus on neglected tropical diseases, which require innovative drug delivery systems for effective treatment(19).
- ii. Food-borne Pathogens and Climate Change (2024): Rising temperatures and extreme weather events increase pathogen spread, requiring robust drug delivery and regulatory oversight for antimicrobial therapies (20).

EU EMA Case Studies

- i. EMA Environmental Policy (2024–2027): Explicitly acknowledges responsibility to safeguard the environment for future generations, integrating sustainability into pharmaceutical regulation(21).
- ii. Transition to Climate-Friendly Medical Inhalers: EMA supported the shift toward inhalers with reduced greenhouse gas propellants, directly linking climate mitigation with respiratory drug delivery innovation.

Intergenerational Equity and Drug Delivery Innovation

The constitutionalisation of climate justice requires a fundamental reorientation of constitutional theory. Climate change, however, is a paradigmatic intergenerational problem. The case of *Neubauer's* intertemporal guarantee of

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freedom extends to safeguarding biomedical innovation. The degradation of ecosystem threatens biodiversity-based drug discovery, making judicial climate protections essential for future pharmaceutical developments.

The Trustee Model and Public Trust Doctrine

One of the most influential jurisprudential tools is the Public Trust Doctrine. Applied to climate change, PTD reframes the atmosphere as a shared commons. Courts in India, the Philippines, and the United States have invoked PTD to justify judicial intervention in environmental matters. The principle of intergenerational equity—first articulated by Edith Brown Weiss—holds that each generation has obligations to conserve the natural and cultural heritage for future generations.

The principle of intergenerational equity was judicially recognized in India's *Vellore Citizens Welfare Forum v Union of India* (22). The Colombian Supreme Court in 2018 recognized the Amazon rainforest as a subject of rights in *Future Generations v Ministry of the Environment*, linking its protection to future citizens (23).

The Temporal Expansion of Rights

Climate justice requires a temporal expansion: rights must be interpreted not only in relation to present harms but also in anticipation of future risks. As Henry Shue has argued, climate change represents a paradigmatic case of intertemporal harm (24).

Synthesis: Weak-Form Review and Proportionality

To resolve critiques of overreach, courts are adopting weak-form judicial review, issuing declarations of incompatibility rather than prescriptive orders. The proportionality test, developed in German constitutional jurisprudence, provides a structured framework for balancing competing rights, allowing courts to balance the right to development against the right to a stable climate (25).

Weak-Form Judicial Review

Under weak-form review, courts do not dictate precise policy outcomes; instead, they issue declarations of incompatibility or identify constitutional deficiencies, leaving the legislature to determine how to remedy them. It allows legislatures to integrate climate obligations with biomedical priorities.

The Proportionality Test

The proportionality test, developed in German constitutional jurisprudence and widely adopted across jurisdictions, provides a structured framework for balancing competing rights (26, 27). Applied to climate justice, proportionality allows courts to balance the Right to Development against the Right to a Stable Climate.

Beyond Anthropocentrism: The Rights of Nature

The 2008 Constitution of Ecuador and Colombian rulings represent the ecocentric turn. Ecuador's Constitution explicitly recognizes the rights of nature (28). The jurisprudential significance lies in the shift from instrumental protection (safeguarding nature for human benefit) to intrinsic protection (safeguarding nature for its own sake) (28,29,30).

The Colombian Supreme Court in 2018 recognized the Amazon rainforest as a subject of rights in *Future Generations v Ministry of the Environment*, linking its protection to future generations (23). This decision illustrates the fusion of ecocentric and intergenerational reasoning (29).

Biomedical Innovations in Legal Contexts

- i. **Regulation of Advanced Drug Delivery Systems** - Nanoparticle inhalables for asthma and COPD (12) for respiratory health require regulatory approved framework that balance innovation with patient safety. The Supreme Court of India ruling on affordable access to essential medicines have streamlined nanomedicine patent enforcement.
- ii. **Climate Justice and Pharmaceutical Equity** – Legal Doctrines like intergenerational equity and public trust doctrine are being extended to healthcare, ensuring that biomedical innovations are distributed fairly in climate-vulnerable regions.
- iii. **Human rights and Biomedical Access** – The recognition of a right to health and right against climate change creates constitutional obligation for states to provide access to advanced therapies to climate-induced health risk. The cases of *Neubauer* and *Ranjitsinh* have linked climate obligations to fundamental right, that can be interpreted to include pharmaceutical access for climate-exacerbated diseases.

Challenges of Climate Justice in the legal and pharmaceutical field

The intersection of law and pharma reveals shared challenges towards creation of an integrated climate justice era which are as follows:

1. Polycentric Governance: Courts risk democratic deficit; pharma faces regulatory fragmentation.
2. Weak-Form Review & Collaborative Regulation: Both domains benefit from dialogue-based governance.
3. Rights of Nature & Eco-Friendly Pharma: Ecocentric jurisprudence parallels biodegradable drug delivery systems.
4. Global Dialogue: Judicial borrowing across jurisdictions mirrors cross-border biomedical collaboration.

CONCLUSION

The emergence of climate justice represents one of the most ambitious and contested developments in contemporary constitutional law. It is both a jurisprudential innovation and a test of constitutional imagination, demanding that courts re-envision their role in safeguarding democracy under conditions of ecological crisis.

In the biomedical domain, climate justice ensures the environmental conditions required for effective drug delivery systems, safeguarding cold-chain logistics, pharmaceutical innovation and equitable access to therapies. By embedding ecological obligations into constitutional frameworks, courts indirectly protect the infrastructure of healthcare and drug distribution, thereby linking climate jurisprudence with intergenerational health equity.

SUGGESTIONS PUT FORWARD BY THE RESEARCHER

- i. Institutional Dialogue: Courts should adopt weak-form review, issuing declarations of incompatibility rather than prescriptive orders.
- ii. Proportionality Frameworks: Judicial reasoning should consistently apply proportionality, balancing climate obligations against development, equality, and biodiversity.
- iii. Ecocentric Integration: The Rights of Nature should be explored as complementary to anthropocentric climate rights, creating a holistic constitutional framework that protects both biomedical resources and ecological communities.
- iv. Global Judicial Dialogue: Courts should continue to borrow reasoning across borders, developing a shared constitutional vocabulary for climate justice while respecting local impact on healthcare and drug delivery technologies.

The constitutionalisation of climate justice is not merely a legal development; it is a civilizational necessity. As the anthropocene unfolds, the survival of constitutional democracy itself depends on the recognition that ecological stability is a prerequisite for freedom.

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