
Climate Constitutionalism, Corporate Due Diligence, and Institutional Transformation: Comparative Legal Governance in Germany and Brazil, 2020–2026

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ABSTRACT

The rapid expansion of artificial intelligence governance between 2020 and 2026 has transformed contemporary legal systems, institutional accountability structures, and global regulatory governance. This article examines how emerging forms of algorithmic constitutionalism have reshaped the relationship between digital regulation, democratic governance, institutional legitimacy, and socio-economic transformation in the European Union and the United States. The article argues that AI governance has evolved beyond a narrow technological regulatory concern into a broader constitutional and institutional project involving competing conceptions of public authority, market regulation, human rights protection, and democratic accountability. Using comparative legal-institutional analysis, the article evaluates the European Union’s rights-based and precautionary regulatory architecture alongside the United States’ fragmented and market-oriented governance model. The findings demonstrate that institutional regulatory capacity significantly shapes the effectiveness, legitimacy, and adaptability of AI governance regimes. While the European Union has pursued centralized regulatory harmonization through the AI Act, Digital Services Act, and data governance reforms, the United States has relied on sectoral governance, executive coordination, and private-standard development. The comparative evidence reveals substantial divergence in regulatory coherence, accountability mechanisms, judicial oversight, and institutional resilience. The article contributes to contemporary legal scholarship by conceptualizing algorithmic constitutionalism as a transformative

governance paradigm linking digital regulation, institutional accountability, public trust, and democratic legitimacy. It further demonstrates how contemporary AI regulation increasingly functions as a central arena of global legal transformation and transnational governance competition

Keywords: artificial intelligence governance; algorithmic constitutionalism; digital regulation; comparative law; regulatory governance; institutional transformation; democratic accountability; European Union law; United States law; digital rights

INTRODUCTION

Climate governance has become one of the defining sites of contemporary constitutional and institutional transformation. Between 2020 and 2026, climate law moved beyond environmental regulation in the narrow administrative sense and increasingly entered the core of constitutional law, human rights law, corporate governance, financial regulation, and transnational public policy. Courts have been asked to determine whether insufficient climate action violates fundamental rights; legislatures have been required to translate long-term carbon neutrality commitments into enforceable statutory pathways; administrative agencies have faced increasing scrutiny over implementation failure; and corporations have become subject to expanding due diligence obligations for environmental and human rights harms across global value chains.

This article argues that climate constitutionalism has emerged as a distinctive form of contemporary legal governance in which climate obligations are no longer framed merely as discretionary policy choices but as institutional duties grounded in constitutional rights, intergenerational justice, legality, and public accountability. The global context confirms this transformation. UNEP reported that more than 3,000 climate litigation cases had been filed globally by 2025, illustrating the rapid expansion of courts as institutional actors in climate governance. At the same time, the European Union's Corporate Sustainability Due Diligence Directive entered into force on 25 July 2024, requiring covered companies to identify and address adverse human rights and environmental impacts across operations and value chains.

Germany and Brazil provide particularly important comparative cases. Germany's Federal Constitutional Court held in 2021 that parts of the Federal Climate Change Act were unconstitutional because they failed to sufficiently specify emissions reductions after 2030, thereby shifting excessive mitigation burdens to future generations. Brazil's Supreme Federal Court, in the Climate Fund case, treated environmental treaties, including the Paris Agreement, as human rights treaties with elevated legal status and required the executive to activate climate financing mechanisms. These decisions reveal a shared global movement toward judicially enforceable climate accountability, but they also expose different institutional logics. Germany constitutionalized climate governance through proportionality, temporal distribution, and statutory planning. Brazil constitutionalized climate governance through environmental rights, anti-regression, separation of powers, and international human rights law.

The academic and policy problem is therefore not whether climate law matters, but how

constitutionalized climate governance reshapes institutional authority, regulatory implementation, and democratic legitimacy. Previous scholarship has emphasized climate litigation as a mechanism of rights protection, particularly through landmark cases involving intergenerational justice and state obligations (Setzer & Higham, 2022). Other scholars have argued that climate constitutionalism strengthens democratic governance by translating abstract climate commitments into legally reviewable duties (Peel & Osofsky, 2020). A further body of literature has examined the interaction between climate law, human rights, and administrative accountability, showing that courts increasingly require governments to justify policy pathways in light of scientific evidence and international commitments (Kotzé, 2021).

However, contemporary literature remains limited in several respects. While previous scholarship emphasizes judicial innovation, it often underestimates the institutional conditions required for judicial decisions to produce durable governance outcomes. While other legal scholars argue that climate litigation can accelerate policy change, they do not always explain why similar judicial interventions produce different implementation trajectories across jurisdictions. Existing comparative legal scholarship also remains limited in linking climate constitutionalism with corporate due diligence, regulatory capacity, fiscal governance, and transnational accountability.

This article identifies five gaps. First, a theoretical gap persists in explaining climate constitutionalism as an institutional transformation rather than merely a rights-based litigation strategy. Second, a comparative legal gap exists regarding how constitutional courts operationalize future-oriented climate duties in different legal systems. Third, an institutional governance gap remains concerning how administrative capacity mediates the relationship between judicial decisions and policy implementation. Fourth, a regulatory gap concerns the emerging relationship between public climate duties and private corporate due diligence. Fifth, a global policy gap persists regarding how national constitutional decisions interact with international climate governance and transnational supply-chain regulation.

The novelty of this article lies in its integrated account of climate constitutionalism as a multi-level governance transformation. The article does not treat German and Brazilian climate decisions as isolated judicial events. Instead, it analyzes them as institutional turning points within broader transformations involving statutory governance, executive accountability, environmental finance, corporate regulation, and global climate law. The article's central analytical framework links climate constitutionalization to institutional accountability, regulatory capacity, democratic legitimacy, and socio-economic resilience.

The article advances the following causal proposition: constitutional climate obligations reshape institutional accountability; institutional accountability depends on regulatory and fiscal capacity; regulatory capacity determines implementation credibility; implementation credibility influences public trust and democratic legitimacy; and these dynamics affect social, economic, and global climate governance outcomes. The research objective is to examine how Germany and Brazil constitutionalized climate governance between 2020 and 2026, why their institutional trajectories diverged, and what these developments reveal about the future of law, governance, and institutional transformation in the climate crisis.

METHODOLOGY

This article employs a comparative constitutional and socio-legal governance methodology integrating doctrinal analysis, institutional comparison, and normative-empirical legal interpretation. Germany and Brazil were selected because they represent two globally significant yet institutionally distinct models of climate constitutionalism. Germany reflects a highly legalized administrative state embedded within the European Union's regulatory architecture, characterized by statutory carbon planning, constitutional proportionality, and strong administrative capacity. Brazil reflects a rights-based constitutional democracy with a powerful supreme court, extensive environmental constitutional provisions, contested executive implementation, and significant global ecological importance due to the Amazon. This case selection enables a structured comparison of how constitutional courts transform climate governance under different political economies, institutional capacities, legal traditions, and environmental pressures. The analysis evaluates constitutional doctrines, statutory frameworks, judicial remedies, administrative implementation structures, climate finance mechanisms, corporate governance obligations, and transnational regulatory interactions.

The article draws on constitutional provisions, court decisions, climate legislation, EU regulatory instruments, government documents, UNEP and OECD materials, peer-reviewed scholarship, and institutional reports from 2020–2026. Analytical interpretation proceeds through cross-case comparison of legal reasoning, institutional design, enforcement mechanisms, policy implementation, and governance outcomes. Triangulation is achieved by comparing judicial decisions with legislative responses, administrative reforms, international policy reports, and scholarly assessments. The methodological limitation is that climate governance remains rapidly evolving and implementation outcomes are still partially indeterminate. Nevertheless, comparative analysis of Germany and Brazil provides a strong basis for identifying how constitutional law, regulatory institutions, and global governance structures interact in contemporary climate transformation.

Findings and Discussion

1. Constitutionalization of Climate Duties and Judicial Transformation

The first major finding is that climate governance in both Germany and Brazil has undergone constitutionalization, but through different doctrinal pathways. Germany's Federal Constitutional Court developed a theory of intertemporal freedom, holding that inadequate post-2030 emissions planning could unconstitutionally burden future generations. This transformed climate mitigation from a political objective into a constitutional requirement of temporally fair legislative planning. The German government subsequently amended the Climate Change Act and adopted a climate neutrality target for 2045.

Brazil's Supreme Federal Court adopted a different but equally transformative approach. In ADPF 708, the

Court held that the executive had a constitutional duty to operationalize the Climate Fund and that environmental treaties enjoy elevated legal significance as human rights instruments. The Brazilian approach therefore constitutionalized climate governance through the right to an ecologically balanced environment, international human rights law, and the anti-regression principle.

The comparative evidence demonstrates that courts are no longer peripheral actors in climate governance. They increasingly function as institutional catalysts requiring political branches to justify climate policy through legal standards of proportionality, reasonableness, non-regression, and intergenerational equity. This confirms scholarship arguing that climate litigation has become a governance mechanism, not merely a dispute-resolution process (Peel & Osofsky, 2020; Setzer & Higham, 2022).

Yet the comparison also shows that judicial constitutionalization does not produce uniform institutional outcomes. Germany's decision operated within a strong administrative state capable of translating judicial requirements into statutory targets. Brazil's decision confronted deeper implementation challenges due to political conflict, fiscal constraints, enforcement gaps, and deforestation governance. Thus, constitutional doctrine matters, but institutional capacity determines whether constitutionalized climate duties become operational governance.

The governance implication is clear: climate courts can redefine legal obligations, but they cannot alone deliver mitigation. Effective constitutional climate governance requires legislative precision, administrative monitoring, fiscal implementation, and scientific accountability.

2. Regulatory Capacity, Administrative Governance, and Implementation Gaps

The second finding is that regulatory capacity mediates the relationship between constitutional judgment and governance outcome. Germany's institutional system has significant advantages in this respect: legally defined emissions targets, sectoral planning mechanisms, administrative reporting structures, and EU-level climate governance obligations. However, recent debates over weakened sectoral targets and renewed litigation show that even high-capacity systems face implementation contestation. Climate activists filed new litigation in 2024 arguing that amended rules weakened enforceability and shifted burdens into the future.

Brazil presents a more complex institutional picture. The Constitution provides strong environmental protections, and the judiciary has demonstrated willingness to intervene. Yet implementation depends heavily on executive agencies, environmental enforcement bodies, budgetary allocation, and political commitment. The Climate Fund case illustrates this directly: the constitutional violation was not the absence of formal law but the paralysis of an existing institutional mechanism.

This comparison reveals an important theoretical point. Climate constitutionalism is not only about rights recognition; it is about institutional activation. Germany's challenge concerns maintaining legal discipline within a mature regulatory state. Brazil's challenge concerns ensuring that constitutional duties are not neutralized by administrative omission, fiscal blockage, or political reversal.

The findings align with institutional governance theory, which emphasizes that formal rules require organizational capacity, monitoring systems, and enforcement credibility (Ostrom, 1990; Ansell & Gash, 2008). They also challenge overly court-centered accounts of climate litigation. Judicial review is powerful when it triggers institutional coordination, but weaker when political branches resist implementation or when administrative agencies lack resources.

The policy implication is that climate governance reform must focus on implementation infrastructure: independent monitoring bodies, transparent climate finance, enforceable emissions pathways, public participation, and judicially reviewable administrative duties.

3. Corporate Due Diligence and the Expansion of Hybrid Climate Accountability

The third finding is that climate governance is shifting from state-centered regulation toward hybrid public-private accountability. The EU Corporate Sustainability Due Diligence Directive marks a major transformation by requiring covered companies to identify, prevent, mitigate, and remedy adverse human rights and environmental impacts across operations and global value chains. This development extends climate constitutionalism beyond public law into corporate governance, supply-chain regulation, and transnational economic ordering.

Germany is especially significant because it already adopted domestic supply-chain due diligence legislation before the EU directive. German corporate governance increasingly connects climate obligations, human rights due diligence, and administrative supervision. Brazil, by contrast, is more exposed as a site of supply-chain risk, especially in agriculture, mining, forestry, and land-use governance. EU due diligence rules may therefore affect Brazilian firms, exporters, and regulators through market access conditions and transnational compliance expectations.

The comparative evidence demonstrates that climate law increasingly operates through regulatory networks rather than single-state command structures. Constitutional courts define public duties; legislatures create statutory obligations; administrative agencies supervise compliance; corporations monitor supply chains; investors demand disclosure; and international organizations generate governance standards.

This supports scholarship on transnational legal ordering and regulatory capitalism (Braithwaite, 2008; Scott, 2021). However, the findings also reveal a legitimacy concern. Corporate due diligence can strengthen accountability, but it may also externalize compliance burdens onto producers in developing economies without sufficient financial and technical support. The result may be a new form of asymmetric climate governance in which powerful markets export standards while vulnerable jurisdictions absorb implementation costs.

The policy implication is that corporate due diligence must be linked with climate finance, capacity-building, fair trade principles, and procedural justice. Otherwise, transnational climate regulation may reproduce structural inequality even while advancing environmental accountability.

4. Democratic Legitimacy, Social Justice, and Intergenerational Governance

The fourth finding is that climate constitutionalism transforms democratic legitimacy by requiring political institutions to justify long-term policy choices affecting future generations and vulnerable communities. Germany’s intertemporal freedom doctrine makes future burdens legally visible. Brazil’s environmental constitutionalism makes ecological protection a present democratic and human rights duty.

Both systems reveal that climate governance is not merely technocratic. It involves distributional decisions about who bears mitigation costs, who benefits from transition policies, and whose rights are protected. Germany’s energy transition affects industrial competitiveness, household costs, labor restructuring, and regional inequality. Brazil’s climate governance affects Indigenous rights, land use, agribusiness, biodiversity protection, and Amazonian communities.

The findings therefore support climate justice scholarship arguing that legal governance must integrate mitigation, adaptation, social equity, and procedural participation (Averchenkova et al., 2021; Savaresi & Setzer, 2022). Constitutional courts can strengthen democratic legitimacy when they require governments to confront these distributive dimensions transparently. However, courts may weaken legitimacy if they appear to displace political decision-making without institutional sensitivity.

The comparative evidence suggests that the most legitimate form of climate constitutionalism is neither judicial supremacy nor political discretion. Rather, it is dialogic institutional accountability: courts establish constitutional boundaries, legislatures design policy pathways, agencies implement and monitor, civil society participates, and corporations internalize responsibility.

Table 1. Comparative Matrix of Contemporary Legal Governance and Institutional Transformation

Variable	Case 1: Germany	Case 2: Brazil	Empirical/L egal Evidence	Analytical Interpretation
Constitutional Doctrine	Intertemporal freedom and proportionality	Environmental rights, anti-regression, human rights treaties	German Federal Constitutional Court 2021; STF ADPF 708	Different doctrines constitutionalize future climate duties
Institutional Capacity	Strong administrative and statutory planning capacity	Strong constitutional text but uneven implementation capacity	Climate Change Act amendments ; Climate Fund litigation	Capacity determines whether judgments become governance
Judicial	Corrective	Activation	Neubauer	Courts operate

Role	review of legislative insufficiency	of blocked executive climate duties	decision; Climate Fund case	as institutional catalysts
Regulatory Model	Carbon budgeting and EU regulatory integration	Constitutional environmental governance and climate finance	EU climate framework; Brazilian constitutional environmental law	Legal design reflects political economy and state structure
Corporate Governance	Strong integration with EU due diligence rules	Supply-chain exposure through exports and land-use sectors	CSDDD 2024; German supply-chain regulation	Climate accountability increasingly becomes transnational
Implementation Risk	Policy weakening and sectoral enforcement disputes	Administrative omission, fiscal blockage, deforestation pressures	2024 German litigation; Brazilian Climate Fund paralysis	Implementation gaps differ by institutional context
Democratic Legitimacy	Future-generation protection through statutory discipline	Environmental rights protection through judicial enforcement	Intergenerational freedom; Paris Agreement as human rights law	Legitimacy depends on transparent burden allocation
Global Governance Impact	Model for rights-based climate planning	Model for Global South climate-human rights litigation	Constitutional climate jurisprudence	Both cases influence transnational climate law
Socio-Economic Implications	Industrial transition, energy costs, labor restructuring	Land use, Indigenous rights, ecological protection	Climate policy implementation debates	Climate law redistributes economic and social burdens
Governance Outcome	High formal coherence but contested enforcement	Strong constitutional mandate but variable execution	Legislative reform and climate finance litigation	Constitutionalization is necessary but insufficient

The table demonstrates that climate constitutionalism produces institutional transformation through different legal and governance pathways. Germany illustrates how constitutional courts can discipline legislative planning within a high-capacity regulatory state. Brazil illustrates how courts can activate constitutional duties when executive inaction

threatens environmental and human rights commitments. The deeper comparative insight is that climate constitutionalism succeeds when judicial doctrine is connected to administrative capacity, fiscal implementation, public participation, and corporate accountability.

Theoretical Propositions

Proposition 1: Climate constitutionalism transforms environmental policy into institutional accountability.

Climate duties become legally meaningful when courts, legislatures, and agencies translate abstract climate commitments into enforceable institutional obligations.

Proposition 2: Regulatory capacity mediates the relationship between constitutional judgment and governance effectiveness.

Judicial decisions are most effective where administrative institutions possess the authority, expertise, resources, and monitoring systems required for implementation.

Proposition 3: Corporate due diligence extends climate constitutionalism into transnational economic governance.

Climate accountability increasingly operates through global value chains, corporate compliance systems, and market-access regulation.

Proposition 4: Democratic legitimacy depends on transparent distribution of climate burdens.

Legitimate climate governance requires public justification of how mitigation costs, adaptation risks, and future burdens are allocated across generations and social groups.

CONCLUSION

This article examined how Germany and Brazil constitutionalized climate governance between 2020 and 2026 and what these developments reveal about contemporary legal and institutional transformation. The central finding is that climate constitutionalism has shifted climate governance from discretionary environmental policy toward legally structured institutional accountability. Courts increasingly require governments to justify climate action in relation to constitutional rights, intergenerational justice, international obligations, and administrative legality.

The comparative analysis shows that Germany and Brazil represent distinct but globally significant pathways. Germany constitutionalized climate governance through intertemporal freedom, proportionality, statutory planning, and carbon budgeting. Brazil constitutionalized climate governance through environmental rights, anti-regression, climate finance duties, and the human rights status of environmental treaties. Both cases demonstrate judicial innovation, but they also show that implementation depends on institutional capacity.

The article contributes theoretically by conceptualizing climate constitutionalism as an institutional transformation process rather than a litigation phenomenon alone. It contributes comparatively by showing how different legal systems translate climate obligations into governance mechanisms. It contributes to policy debates by emphasizing that effective climate governance requires courts, legislatures, agencies, corporations, and international institutions to operate within an integrated accountability framework.

The institutional implications are substantial. Climate constitutionalism can strengthen democratic legitimacy when it forces political actors to justify long-term risks and social burdens. Yet courts cannot substitute for administrative expertise, fiscal commitment, or participatory governance. The global governance implication is equally important: climate law is increasingly transnational, linking constitutional courts, corporate due diligence, international treaties, and supply-chain regulation.

This review is limited by the continuing evolution of climate governance and by the early implementation stage of several regulatory reforms. Future research should examine how climate constitutionalism operates in Asia, Africa, and small island states, where vulnerability, institutional capacity, and global inequality produce different legal dynamics. Further research should also analyze whether corporate due diligence regimes reduce environmental harm or merely redistribute compliance costs across global value chains.

Ultimately, climate constitutionalism is becoming a central legal form of twenty-first-century governance. Its success will depend not only on judicial courage but on institutional coordination, democratic legitimacy, social justice, and sustained regulatory capacity.

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