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The Impact of International Environmental Law Obligations on the Principle of Intergenerational Equity and Its Legal Obstacles During the Period 1972–2024

1. Davood. Keramati ¹: Ph.D. Student, Department of International Law, Ka.C., Islamic Azad University, Karaj, Iran
2. Armin. Amini ²: Associate Professor, Department of International Relations, Ka.C., Islamic Azad University, Karaj, Iran
3. Fatemeh. Binazade ³: Assistant Professor, Department of International Law, Ka.C., Islamic Azad University, Karaj, Iran

*corresponding author's email: arminamini@iau.ir

ABSTRACT

Intergenerational equity, as a concept concerned with the rights and interests of future generations, emphasizes the necessity of responsible utilization of natural resources and environmental protection. This concept entered the contemporary discourse of international environmental law with the 1972 Stockholm Conference and, by 2024, had been further developed through major international instruments, including the 1992 Rio Declaration, the United Nations Framework Convention on Climate Change, the Kyoto Protocol, the Paris Agreement, the Convention on Biological Diversity, and the Declaration on Future Generations. Employing a descriptive-analytical method and analyzing international instruments and judicial decisions, the present study examines how these instruments, through the establishment of state obligations, the creation of legal frameworks, and the strengthening of mechanisms for international cooperation, can contribute to ensuring future generations' access to minimum standards of living and sustainable natural resources. The findings indicate that the principle of intergenerational equity requires development and the exploitation of natural resources to be regulated in a manner that safeguards the legitimate rights and interests of future generations and establishes an appropriate balance between the interests of the present generation and those of subsequent generations. Nevertheless, the existing legal regime has a hybrid structure: some relevant norms are articulated in declarations and other soft-law instruments, whereas others have materialized as binding treaty obligations, particularly obligations of conduct and procedural obligations. Accordingly, international environmental law cannot be characterized in its entirety as soft law. However, the fragmentation of legal rules, the weakness of certain enforcement mechanisms, the dependence of implementation on the political will of states, and the difficulties associated with the representation of future generations have reduced its practical effectiveness. The principal contribution of this study lies in providing a systematic analysis of the historical and legal development of international obligations during the period 1972–2024 and assessing the extent of their impact on intergenerational equity. Finally, the adoption of a comprehensive convention on intergenerational equity, consideration of the possibility of internationally criminalizing ecocide, and the establishment of a judicial mechanism or a specialized environmental chamber are proposed as measures for strengthening the enforcement of this principle.

Keywords: *Intergenerational equity, international environmental law, legal obligations, sustainable development, future generations, international instruments 1972–2024*



Introduction

The concept of justice has always been one of the most fundamental yet contested concepts in the history of human thought. Thinkers in ethics, political philosophy, and law have for centuries sought to define, explain, and realize justice without reaching a definitive and universally accepted answer. Nevertheless, there is a general consensus among legal philosophers that the ultimate purpose of law is the realization of justice and fairness. At a deeper level, however, this apparent agreement is accompanied by serious disagreements concerning the meaning of justice, the scope of application of the principle of fairness, and the criteria for its realization, such that different interpretations of these concepts have resulted in divergent understandings of the functions and requirements of the legal system. The distinction between the “concept of justice” and “different conceptions of justice” demonstrates that justice is not merely an abstract idea but rather a normative and action-oriented concept directly connected with social, political, and legal decision-making. In this sense, justice constitutes a criterion for evaluating human conduct, public policymaking, and the distribution of benefits and burdens across different spheres of social life. Throughout the history of ethical and political thought, justice has often been concerned with the justification and regulation of unequal relationships within society. A substantial proportion of theories of justice, particularly in the contemporary era, have focused on distributive justice, which concerns the rules governing property, wealth transfers, taxation, resource exploitation, and the role of institutions that produce and consume wealth. Nevertheless, the traditional focus on intragenerational justice gradually encountered a fundamental challenge, namely the neglect of the rights and interests of future generations (1-5).

Accordingly, from the final decades of the twentieth century onward, alongside growing awareness of environmental fragility, intensified depletion of natural resources, widespread pollution, and the long-term consequences of human activities, the concept of “intergenerational equity” emerged as a new dimension of justice. This concept is founded on the idea that the present generation is not merely a beneficiary of natural resources but also a trustee of those resources for future generations. From this perspective, contemporary environmental decisions have direct and sometimes irreversible consequences for the habitability, health, and welfare of future generations (4, 6).

Technological developments, diversification in methods of exploiting nature, population growth, increasing consumerism, and the profit-oriented logic of the global economic system have placed unprecedented pressure on the environment. This situation has generated serious concern that unchecked human greed may result in the destruction of natural capital and the weakening of the ecological foundations upon which future generations depend. A concern initially confined largely to theoretical and academic debates has gradually become one of the central issues of public discourse, policymaking, and international law (7, 8).

In this context, international environmental law, as a dynamic branch of international law, has responded directly to these developments and has sought to protect the environmental interests of future generations through the recognition of new principles, obligations, and mechanisms. Concepts such as sustainable development, the precautionary principle, the prevention principle, common but differentiated responsibilities, and consideration for the interests of future generations have gradually become established in international instruments, practice, and legal discourse. Nevertheless, the extent to which these legal requirements have actually contributed to the realization of intergenerational equity remains subject to doubt and debate (9-12).

Numerous challenges arise in this regard, including ambiguity surrounding the legal status of future generations, the difficulty of legally representing them, conflicts between states' short-term interests and long-term environmental requirements, weak international enforcement mechanisms, inequalities of power among states, and the profound gap between declaratory commitments and actual state conduct. Furthermore, a fundamental question concerns whether the obligations arising under international environmental law have effectively elevated the principle of intergenerational equity from the level of rhetoric and moral normativity to that of a binding legal rule (13-15).

The rationale for selecting this subject lies in the growing significance of environmental crises at the global level and their profound relationship with human rights, human security, and the survival of future generations. Examining the impact of international environmental law obligations on the principle of intergenerational equity makes it possible to assess the effectiveness of the international legal system in responding to one of the most fundamental challenges of the contemporary era. This study may also reveal existing theoretical and practical gaps in this field and contribute to the development of legal scholarship concerning the relationship between the environment and intergenerational equity. From this perspective, environmental degradation may also affect fundamental rights such as the rights to life, health, and food security (10, 16, 17).

The necessity of addressing this subject is further reinforced by the fact that the period from 1972 to 2024 encompasses the formation, evolution, and expansion of international environmental law; a period during which international law developed from the initial recognition of environmental concerns to the acceptance of complex and multilayered international obligations. Analyzing these developments makes it possible to examine, from both historical and analytical perspectives, the manner in which international environmental law has influenced the concept and realization of intergenerational equity. Accordingly, the principal research question is: What impact did the obligations of international environmental law have on the principle of intergenerational equity during the period from 1972 to 2024?

The Impact of Foundational Instruments on the Consolidation of Intergenerational Equity in the International Legal Order

The evolution of intergenerational equity in international environmental law has been less the product of a single legislative moment or individual treaty than the result of a gradual process that accelerated at critical turning points such as the Stockholm Conference, the Rio Conference, and the post-2015 climate regime. In its preamble, the Charter of the United Nations refers to the determination of the peoples of the United Nations to save "succeeding generations" from the scourge of war, while Articles 1(3), 55, and 56 provide for international cooperation in addressing economic, social, and humanitarian problems and promoting higher standards of living. Although the Charter does not directly establish an environmental rule concerning intergenerational equity, it provides a normative foundation for future-oriented considerations and international cooperation (12).

The 1972 Stockholm Declaration was the first comprehensive global declaration concerning the human environment and, through Principles 1 and 2, linked environmental and natural-resource protection to the interests of both present and future generations. However, the term "sustainable development," in the meaning subsequently attributed to it, was not formulated in the Stockholm Declaration. The principal contribution of the Declaration was its explicit incorporation of an intergenerational dimension into the principles of global environmental policymaking and its provision of an ethical and normative foundation for subsequent instruments (9, 18). Following Stockholm, the 1992 Rio Declaration and Agenda 21 sought to operationalize the relationship between environment and

development more comprehensively. Principle 3 of the Rio Declaration provides that the right to development must be fulfilled so as to equitably meet the developmental and environmental needs of present and future generations. Agenda 21 likewise established a range of action programs for the protection of natural resources, pollution reduction, and the integration of environmental considerations into development. Despite their non-binding character, these two instruments have influenced policymaking and the subsequent interpretation of legal obligations (9, 18).

The incorporation of certain environmental requirements into treaty law represented the next important step. Article 3 of the United Nations Framework Convention on Climate Change emphasizes equity, common but differentiated responsibilities, and protection of the climate system for the benefit of present and future generations. The Kyoto Protocol additionally established quantified emission-reduction commitments for Annex I Parties; consequently, its obligations were neither uniform nor applicable in the same manner to all states. These instruments demonstrate that intergenerational reasoning can enter hard law through specific treaty obligations, although their scope and intensity may differ (15, 18). The 2015 Paris Agreement refers in its preamble to “intergenerational equity,” but does not create or guarantee an independent right for future generations. Although the Agreement, as a treaty, is binding upon its parties, its architecture is hybrid: obligations such as preparing, communicating, maintaining, and updating nationally determined contributions and fulfilling reporting requirements are procedural and legally binding, whereas the substantive level of emission-reduction outcomes is largely nationally determined. Accordingly, the Agreement’s impact on intergenerational equity must be assessed through the relationship among its long-term temperature objective, its ambition-enhancement cycle, transparency requirements, and differentiated responsibilities of states (18, 19).

International judicial bodies have also contributed to elucidating the future-oriented dimension of environmental obligations. International adjudication has recognized the environment as encompassing the living space and health of human beings, including generations yet unborn, emphasized the need to reconcile economic development with environmental protection within the framework of sustainable development, and acknowledged environmental impact assessment as an obligation under international law where there is a risk of significant transboundary harm. More recent developments in the law of the sea have likewise strengthened the application of due diligence standards to anthropogenic greenhouse gas emissions affecting the marine environment. The 1987 Montreal Protocol—not 1985—and Part XII of the United Nations Convention on the Law of the Sea also constitute examples of specific treaty obligations concerning environmental protection (9, 12, 18). In summary, foundational international instruments demonstrate that intergenerational equity has evolved from an ethical and declaratory concern into a guiding principle for policymaking and the interpretation of treaty obligations. This evolution does not mean that intergenerational equity has, in all its dimensions, become an independent and universally binding legal rule. Rather, certain obligations associated with it have been incorporated into binding treaties, while the principle itself continues primarily to perform normative and interpretive functions. Post-2015 climate instruments have deepened this logic at three levels: conceptually, by emphasizing equity; normatively, by connecting it with long-term objectives; and procedurally, by strengthening planning, reporting, and opportunities for accountability (18, 19).

Assessing the Possibility of Elevating Intergenerational Equity to the Status of a Customary or Peremptory Norm

One of the central questions in assessing the current status of intergenerational equity in international environmental law is whether this principle remains merely a “guiding principle” and interpretive criterion or whether it may be regarded as gradually moving toward the status of a general rule of customary international law and, according to some progressive interpretations, even toward the status of a peremptory norm. Addressing this question requires a systematic examination of the constituent elements of customary international law, an assessment of the practice of states and international institutions, and an analysis of the theoretical and practical obstacles preventing the explicit recognition of intergenerational equity as a binding rule within the normative hierarchy of international law. Focusing on three principal dimensions, this section first identifies the elements relevant to the possible customary status of intergenerational equity at the levels of *opinio juris* and practice, subsequently offers a critical analysis of state practice and judicial and quasi-judicial practice, and finally evaluates the legal and structural barriers to elevating this principle to the status of customary international law or *jus cogens*, with the aim of clarifying both the potential and limitations of intergenerational equity within the long-term development of international environmental law.

Elements of Customary International Law

The question of elevating intergenerational equity to the status of a customary rule depends, in the first instance, upon the extent to which the two classical elements of customary international law—a “general and relatively consistent practice of states” and *opinio juris*—can be identified in relation to this principle (12). From this perspective, intergenerational equity is a multidimensional principle encompassing both a substantive dimension—the equitable distribution of environmental benefits and risks among generations—and a procedural dimension—the requirement to consider the interests of future generations in policymaking and decision-making processes. The question addressed in this subsection is whether these two dimensions have become sufficiently embedded in state conduct and legal conviction to support the conclusion that a rule of customary international law is emerging (4, 20). At the level of *opinio juris*, significant indications of acceptance of intergenerational equity can be found in the official discourse and written statements of states and international institutions. In recent decades, numerous political declarations adopted in the context of United Nations environmental conferences, outcome documents of summit meetings, joint state declarations concerning climate change, biodiversity, and the rights of future generations, as well as certain national parliamentary instruments, have explicitly or implicitly referred to “responsibility toward future generations” as an obligation possessing a legal dimension (19). In these instruments, expressions such as “obligations towards future generations,” “responsibility to future generations,” and “duties to future generations” have been used not merely as political aspirations, but as concepts situated alongside human rights, sustainable development, and the rule of law. This trend suggests that an implicit acceptance of the existence of intergenerational obligations is gradually developing within the legal consciousness of states. Nevertheless, the strength and scope of *opinio juris* concerning intergenerational equity remain uneven. Some states—particularly those at the forefront of climate vulnerability or environmental degradation—clearly emphasize the legal dimension of intergenerational obligations and connect them with human rights, the right to a healthy environment, and the right to development. By contrast, other states, despite accepting intergenerational terminology in statements and speeches, continue to treat it primarily as a “value-based and political” concept and avoid accepting legal

consequences that could restrict their freedom of action or their permanent sovereignty over natural resources. This divergence means that the existence of a universal and uniform *opinio juris* regarding intergenerational equity remains open to question (4, 20).

A similar situation is observable at the level of practice. If state practice is examined in key areas such as climate policies, management of shared resources, environmental impact assessment, adoption of domestic legislation concerning future generations, and establishment of national institutions representing the interests of future generations, numerous examples can be identified of conduct consistent with the logic of intergenerational equity. These include incorporating intergenerational criteria into development-planning instruments, requiring assessment of the long-term impacts of major projects, and establishing institutions tasked with protecting the interests of future generations. However, these measures are not uniform in geographical scope, consistency, or their explicit identification with intergenerational equity and tend to remain concentrated within particular legal systems and regions (19). From a theoretical perspective, some scholars have argued that even where the two customary elements cannot yet be regarded as fully satisfied, intergenerational equity may be considered to be transitioning from “soft law” toward “emerging customary law,” that is, a stage in which non-binding instruments, fragmented practices, and legal discourse are converging toward a customary rule, although full coherence has not yet been achieved (4, 20). This interpretation is compatible with the long-term and complex nature of intergenerational equity, while simultaneously indicating that, without strengthening both state practice and *opinio juris*, it would be premature from the methodological perspective of international law to claim the full crystallization of this principle as customary international law.

Analysis of State Practice

Analyzing state practice in order to assess the possibility that intergenerational equity may become customary international law requires simultaneous consideration of three levels: domestic law, policymaking and international diplomacy, and participation in treaty and judicial regimes. At each of these levels, state conduct may provide evidence of either acceptance of or resistance to intergenerational reasoning. At the domestic-law level, some countries have adopted measures that are highly significant from the perspective of intergenerational equity. These include incorporating explicit references to the “rights of future generations” or “responsibility toward future generations” into constitutions or constitutional legislation, adopting specific climate, energy, and natural-resource legislation emphasizing the interests of future generations, and establishing institutions such as ombudsmen for future generations or councils for sustainable development with explicit intergenerational mandates (19). Even if such measures do not directly become customary international law, they demonstrate that a significant number of states have accepted intergenerational equity as a legitimate and justified approach to regulating relations among generations and have begun institutionalizing it within their domestic legal systems. At the policymaking and diplomatic levels, state practice at climate, environmental, and development conferences provides significant indications of how governments understand intergenerational obligations. Many states, in official statements, national declarations, and nationally determined contributions (NDCs), identify the “protection of the interests of future generations” as one of the principal objectives of climate and environmental policy. Expressions such as climate justice for future generations and references to moral and legal responsibility toward future generations have become increasingly prominent in recent years (19). Nevertheless, the gap between such normative discourse and actual policies—particularly in states that continue production and consumption patterns inconsistent with

intergenerational equity—demonstrates that state practice is frequently dual in character: discursive acceptance of intergenerational equity at the diplomatic level coexists with practical resistance to its restrictive implications for short-term economic and political interests. Within treaty and judicial regimes, certain forms of state conduct may be interpreted as indications that intergenerational equity is approaching customary status. For example, when states invoke the interests of future generations in climate or environmental litigation, whether domestically or internationally, and formulate such claims in legal rather than merely ethical terms, they contribute to strengthening the element of *opinio juris*. Likewise, when states support the inclusion of long-term obligations, intergenerational objectives, and mechanisms for monitoring long-term effects during treaty negotiations, a form of practice consistent with intergenerational equity develops, even though states do not participate in this process to the same degree (4, 19, 20). Nevertheless, critical analysis of state practice demonstrates that the most significant obstacle to the customary development of intergenerational equity is the profound heterogeneity of state interests and capacities. Developed and developing states, as well as major fossil-fuel exporters and climate-vulnerable countries, hold different understandings of intergenerational equity and sometimes invoke the concept to preserve existing positions or shift the burden of adjustment onto others. Such instrumental use creates the risk that intergenerational equity may become a flexible slogan devoid of determinate normative content, interpreted by each state according to its own interests without producing objective and measurable obligations (4, 20). Consequently, it may be concluded that state practice is such that, on the one hand, intergenerational equity cannot be regarded as merely an ethical and non-legal concept, given the substantial evidence of its normative and practical acceptance, while, on the other hand, it remains premature to claim the existence of a general and binding customary rule in this field. This intermediate position highlights the need for further clarification of the precise content of intergenerational obligations and for transforming political discourse into concrete legal obligations.

Assessment of Existing Legal Obstacles

Even if indications of *opinio juris* and practice consistent with intergenerational equity can be identified, elevating this principle to the status of a general rule of customary international law—and, *a fortiori*, to the level of a peremptory norm—faces serious legal and structural obstacles. This subsection examines the most important of these barriers. The first obstacle concerns the nature of the “silent actors” of intergenerational equity. Future generations possess neither classical legal personality within the international legal system nor established representatives capable of asserting or enforcing rights and obligations on their behalf. This situation raises questions concerning who constitutes the “rights-holder” under intergenerational equity and how corresponding obligations may become enforceable and legally claimable (19). Whereas classical human rights law is based on the rights of existing persons and provides relatively defined procedural mechanisms for bringing claims and obtaining remedies, intergenerational equity continues to lack adequate theoretical and institutional mechanisms for representation, standing, and enforcement. This deficiency complicates its recognition as a customary rule carrying strong enforceable consequences. The second obstacle concerns the difficulty of proving customary elements in a field that is inherently “future-oriented.” Customary international law generally develops through repeated conduct over time and the emergence of a stable pattern founded upon *opinio juris*; intergenerational equity, however, is inherently concerned with long-term and future consequences rather than solely with current practice. This tension between the “temporality of custom” and the “temporality of intergenerational equity” has led some scholars to question whether the classical methodology of customary international law can adequately

address this field and to propose alternatives such as reliance on “general principles of law” or a “modern understanding of process-based custom” (4, 20). Until such methodological questions are resolved, claims that intergenerational equity has achieved customary status will continue to face theoretical difficulties.

The third obstacle is doctrinal resistance to recognizing new peremptory norms in the fields of environmental protection and intergenerational justice. Elevating any principle to the status of a peremptory norm requires broad and clear acceptance by the international community that the principle is fundamental to the international legal order and that no derogation from it is permitted under any circumstances. Although certain recent opinions and legal arguments have raised the possibility of identifying peremptory elements in environmental protection and responses to climate change, the general acceptance and legal recognition required to characterize intergenerational equity as a peremptory norm have not yet emerged. Moreover, existing discussions concerning peremptory norms have not established intergenerational equity or a general environmental norm as falling within that category (12). Considerable caution also remains evident in debates concerning “international environmental crimes” and the “right to a healthy environment” when proposals are made to expand the category of peremptory norms.

The fourth obstacle concerns potential conflicts between intergenerational equity and traditional principles such as permanent sovereignty over natural resources and freedom of economic development. Many states are concerned that recognition of intergenerational equity as a customary or peremptory norm could impose stringent limitations on their authority to exploit resources and determine their preferred development models. Particularly among developing countries, there is concern that if intergenerational equity is interpreted without adequate regard for sovereign equality and the right to development, it could become an instrument for perpetuating North–South inequalities (19). This political sensitivity directly affects states’ willingness to accept the normative and legal consequences of intergenerational equity. The fifth obstacle is conceptual fragmentation and the plurality of interpretations of intergenerational equity. Some approaches understand it simply as the avoidance of imposing irreversible risks on future generations; others extend it to the equitable distribution of development opportunities, access to resources, and preservation of biodiversity; still others incorporate cultural, identity-based, and generational dimensions. Until a minimum conceptual consensus is achieved regarding the “core content” of intergenerational equity, its transformation into a customary or peremptory norm will remain vulnerable to ambiguity and misunderstanding (4, 20).

Despite these obstacles, it would also be incorrect to conclude that intergenerational equity has no potential to develop into customary international law. At present, intergenerational equity operates as a “guiding principle” and an “interpretive criterion” across numerous environmental and climate regimes, and recent trends—particularly in judicial practice and advisory proceedings concerning climate change—suggest that the principle may acquire stronger normative status in the future. In the short term, however, it is more likely that intergenerational equity will remain an “emerging customary norm” and a “general legal principle with an interpretive function,” while its elevation to the status of a general customary or peremptory norm would require more profound transformations in the structure of international law and global politics.

The Impact of Environmental Obligations on the Transformation of International Decision-Making Structures

The obligations of international environmental law have not merely transformed the substantive content of states’ obligations; they have also gradually altered the logic and structure of international decision-making and,

consequently, have produced a form of “institutional reconfiguration” favoring foresight and intergenerational sustainability (21). Environmental and climate regimes—particularly in light of sustainable development, the 2030 Agenda, and the Paris Agreement—have encouraged international decision-making to move beyond short-term and reactive horizons toward long-term planning, scenario development, and structured reporting concerning long-term consequences (19, 21). Within this framework, the present section analytically examines how environmental obligations have redesigned international decision-making structures by introducing foresight into policymaking, requiring long-term planning, and transforming reporting and transparency systems in ways that accord greater weight to the interests of future generations and intergenerational equity (18, 19).

Incorporating “Foresight” into Policymaking

The incorporation of foresight into international policymaking constitutes one of the most profound consequences of environmental obligations and is directly connected with intergenerational equity. Within the classical international legal order, decision-making often revolved around states’ immediate interests, short-term economic horizons, and immediate security considerations, while the future was commonly perceived as an indeterminate sphere lying beyond the scope of legal obligation. Environmental and climate crises, however, have demonstrated that the consequences of present decisions may extend across decades or centuries and are frequently irreversible. This reality has transformed international law’s conception of temporality and has made the “future” one of the central dimensions through which the legitimacy of policymaking is assessed (21). Within this framework, environmental and climate obligations have compelled states and international organizations to institutionalize forward-looking tools, including scenario planning, trend analysis, long-term impact assessments, and intergenerational studies, within decision-making processes. For example, numerous strategic environmental instruments emphasize that policies should be designed on the basis of “future-oriented analyses” and “long-term scenarios” so as to minimize risks to future generations (19, 21). This conceptual transformation has shifted decision-making structures away from reactive crisis management toward “anticipatory governance,” under which risks are identified in advance and policies are designed to address them before crises materialize (21).

At the institutional level, incorporating foresight into international policymaking has resulted in the creation or strengthening of mechanisms specifically intended to represent the interests and rights of future generations in decision-making processes. A prominent illustration of this trend is the growing institutional attention given to strengthening representation for future generations and to incorporating the interests of future generations into global governance structures. Proposals for dedicated representatives of future generations must, however, be distinguished from the actual legal establishment of such offices (19, 21). These initiatives demonstrate that foresight is no longer merely a technical methodology but is increasingly reinforced as a strategic principle within the institutional architecture of the United Nations and other international organizations. At the practical level, foresight in environmental policymaking means designing policies that consider not only short-term indicators, such as immediate economic growth or reductions in current expenditure, but also long-term indicators such as ecosystem resilience, resource sustainability, and preservation of the capacity of future generations to meet their basic needs. Consequently, long-term assessments have become increasingly important in international decision-making processes, to the point that neglecting intergenerational effects may undermine the legitimacy of a decision or policy (19, 21). Accordingly, it may be argued that the integration of foresight into policymaking through environmental obligations has transformed international decision-making structures at three levels: epistemically, by changing

actors' understanding of time and the consequences of decisions; instrumentally, by institutionalizing methods of futures analysis and scenario planning; and institutionally, by creating and strengthening mechanisms intended to represent the interests of future generations within decision-making processes (19).

Requirement of Long-Term Planning

One of the most significant manifestations of the impact of environmental obligations on international decision-making structures is the strengthening of long-term planning and its transformation, depending on the specific instrument concerned, into a combination of procedural obligations, institutional expectations, and policy recommendations. In classical regimes, long-term planning largely belonged to the sphere of domestic policymaking and remained within the discretion of states. Climate and environmental crises, however, because of their transnational and intergenerational nature, have led international instruments to require or encourage states to formulate long-term strategies and objectives and to institutionalize this expectation through legal and quasi-legal frameworks. A prominent example of this transformation can be found in mechanisms that require or encourage states to establish "long-term decarbonization objectives" or "long-term low-carbon development strategies." Such requirements move states beyond short-term planning confined to one or two electoral cycles and oblige them to define multi-decadal visions for the economy, energy systems, and infrastructure—visions that are structurally connected with the interests of future generations (19). Consequently, in certain regimes, long-term planning has moved beyond being a purely domestic policy instrument and has become part of international mechanisms of action, reporting, and assessment that may serve as a basis for evaluation and accountability within the international community. From the perspective of intergenerational equity, this transformation is particularly important because long-term planning makes it possible to assess the costs and benefits of environmental policies over extended periods and to prevent the inequitable transfer of risks and burdens to future generations (21). For instance, when a development strategy focused exclusively on rapid exploitation of fossil-fuel resources for short-term growth is evaluated within a framework of long-term planning and climate scenarios, it becomes possible to identify the extent to which risks—including rising temperatures, threats to food and water security, and ecosystem degradation—are transferred to subsequent generations. In this manner, the requirement of long-term planning functions as a mechanism through which intergenerational equity is incorporated into the logic of economic and developmental decision-making.

At the institutional level, international organizations and specialized bodies have developed tools and frameworks to support these requirements and assist states in undertaking long-term planning in standardized and comparable ways. Specialized reports on climate scenarios, long-term risk assessments, sustainable-development guidelines, and frameworks for future-oriented governance constitute examples of such instruments (21).

This process not only enhances the technical capacity of states but also creates a degree of methodological convergence in approaches to the future and thereby facilitates normative dialogue concerning intergenerational equity at the international level. At the same time, long-term planning requirements generate challenges for decision-making structures, including tensions between the extended temporal horizons of environmental obligations and the short-term horizons of political and electoral institutions, as well as conflicts between long-term plans and immediate economic pressures. Nevertheless, these very challenges have stimulated debates concerning the need to reform governance structures, including by strengthening independent foresight institutions, reforming budgeting rules, and redesigning indicators of economic success (19). From this perspective, the

requirement of long-term planning is not merely a technical instrument but also a driver of broader reconsideration of the architecture of international governance.

Transformation of Reporting Systems

The transformation of reporting and transparency systems constitutes the third major dimension of the impact of environmental obligations on international decision-making structures. Reporting within early environmental regimes was largely limited to the provision of general and non-binding information, primarily serving informational and confidence-building functions. However, as environmental and climate obligations became more developed, reporting evolved into a central instrument of “intergenerational governance,” because without accurate, regular, and comparable reporting it is impossible to assess the extent to which states are fulfilling obligations relevant to future generations. Within the contemporary climate regime, the enhanced transparency framework provides a prominent example of this development. Taking into account the flexibilities available to developing countries, the framework requires parties to provide periodic information concerning greenhouse gas emissions, progress in implementing commitments, climate-change impacts, adaptation measures, and financial support. Such information provides a basis for collective assessment of progress toward long-term objectives and for evaluating intergenerational equity in the distribution of mitigation and adaptation burdens (18). Reporting, therefore, is no longer merely a formal obligation but has become an integral component of the basic structure of environmental commitments. From the perspective of intergenerational equity, the transformation of reporting systems has two important consequences. First, it creates an “institutional memory” of the paths taken: successive reports document long-term trends and make it possible for future generations to assess the extent to which states acted honestly and diligently in fulfilling their obligations (18). Second, it strengthens both horizontal and vertical accountability: civil society, oversight institutions, and even judicial bodies may rely on reported data to question governments concerning policies that risk unfairly transferring costs and risks to future generations (18, 19).

At the structural level, the transformation of reporting systems has itself led to the redesign of domestic decision-making processes within governments and organizations. In order to provide comprehensive and coherent reports, different administrative bodies—from environment and energy authorities to economic and planning institutions—must coordinate with one another, integrate data, and provide a coherent picture of current conditions and future trajectories. This internal coordination, in turn, enables intergenerational reasoning to permeate the broader structure of government rather than remaining confined to a single ministry or institution (19).

Moreover, in response to new transparency requirements, many international organizations and specialized bodies have developed new reporting guidelines and standards that explicitly emphasize intergenerational dimensions, including requirements to provide information concerning the long-term effects of policies on vulnerable groups, future generations, and key natural systems. Such standards, on the one hand, increase expectations placed upon states and, on the other hand, provide more objective criteria for assessing the extent to which policies conform to intergenerational equity (18, 19).

The transformation of reporting systems may therefore be understood as the connecting link among normative obligations, institutional structures, and decision-making processes—a link without which intergenerational equity would remain largely rhetorical. Transparency and regular reporting not only enable the international community to monitor compliance with environmental obligations but also facilitate claims and accountability efforts undertaken

by the present generation on behalf of future generations and contribute to the gradual development of new customary norms and standards protecting their interests (19).

Conclusion and Recommendations

The present study examined the impact of international environmental law obligations on the principle of intergenerational equity during the period from 1972 to 2024 and demonstrated that intergenerational equity has gradually evolved from an ethical and philosophical idea into a principle capable of being invoked within international environmental law. An examination of international instruments, environmental treaties, and the practice of international institutions indicates that protection of the interests of future generations has become one of the major concerns of the international community and that states are increasingly required to consider the long-term consequences of their environmental decisions. The findings demonstrate that although various international instruments have emphasized the need to protect the environment for future generations, a substantial gap continues to exist between declaratory commitments and their practical implementation. The principle of intergenerational equity also faces challenges such as the absence of effective enforcement mechanisms, conflicts with states' economic interests, and weaknesses in supervisory mechanisms. Nevertheless, the gradual development of international environmental law, the emergence of common obligations, and the increasing role of international institutions indicate that the international legal system is moving toward greater recognition of states' responsibilities toward future generations. Ultimately, the genuine realization of intergenerational equity requires strengthened international cooperation, more effective implementation mechanisms, and the transformation of ethical commitments into binding legal obligations in order to ensure more effective protection of the rights of future generations and the global environment.

Accordingly, developments in international environmental law during the period from 1972 to 2024 demonstrate that the obligations arising from international environmental law have played a decisive role in strengthening, developing, and gradually institutionalizing the principle of intergenerational equity. The findings of this study indicate that this influence did not occur immediately or through a single transformation but rather emerged gradually and incrementally and can be identified across normative, treaty-based, and institutional dimensions. In the first dimension, namely the normative dimension, the findings demonstrate that international environmental law has provided the conceptual and theoretical foundations necessary for accepting the idea of intergenerational equity through the development of fundamental principles such as sustainable development, the precautionary principle, the prevention principle, the principle of reasonable and equitable use of natural resources, and the principle of common but differentiated responsibilities. Although these principles do not necessarily refer directly to future generations, they are inherently based on long-term temporal reasoning and consideration of the transboundary and future-oriented effects of state decisions. Consequently, analysis of the substantive content of these principles demonstrates that intergenerational equity has gradually entered the international legal system indirectly through the development of these normative principles.

In the second dimension, namely the treaty-based dimension, the examination of treaties and international instruments demonstrates that since the 1972 Stockholm Conference there has been a growing tendency toward the explicit or implicit recognition of the interests of future generations in both binding and non-binding instruments. This trend reached an important turning point with the 1992 Rio Conference and, in particular, with the consolidation of sustainable development, under which the concept of sustainable development as a legal-policy framework

directly emphasized the need to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. In the field of climate change, treaties such as the 1992 Framework Convention on Climate Change and the 2015 Paris Agreement have indirectly incorporated the logic of intergenerational equity into their legal structures through the establishment of procedural and structural obligations for states. In the field of biodiversity and ecosystem protection, instruments such as the Convention on Biological Diversity likewise demonstrate that the protection of natural resources possesses a dimension extending beyond states' short-term interests and is oriented toward long-term and intergenerational interests. In the third dimension, namely the institutional and implementation dimension, the findings demonstrate that the emergence and development of monitoring and compliance mechanisms within international environmental law have played an important role in strengthening the practical operation of intergenerational equity. The establishment of periodic reporting systems, mechanisms for monitoring and assessing state obligations, supervisory committees and bodies operating under environmental treaties, and the development of collective-review procedures all demonstrate the movement of international law toward greater transparency, accountability, and reviewability of state conduct in the environmental field. Although these mechanisms were not necessarily designed explicitly under the heading of intergenerational equity, in practice they increasingly require states to take account of the long-term consequences of their decisions for future generations.

At the same time, the analysis conducted in this study demonstrates that, despite these developments, intergenerational equity has not yet become fully consolidated as an independent and binding rule of international law. The principle continues to appear primarily through general principles, standards of conduct, soft-law obligations, and interpretive criteria within international environmental law and has been institutionalized to a lesser degree through explicit and precise obligations backed by robust enforcement mechanisms. In other words, rather than constituting a fully established rule of hard law, intergenerational equity should be regarded as an evolving principle undergoing progressive institutionalization within the structure of international law. The findings further demonstrate that the most significant obstacles to its complete and effective realization can be identified in several principal factors. First, enforcement remains weak with respect to part of the relevant normative framework because soft-law instruments continue to exist alongside binding treaties and because enforcement mechanisms for certain treaty obligations remain inadequate. Many principles and instruments associated with intergenerational equity are formulated as soft-law commitments, declarations, or standards of conduct, and even numerous binding treaties do not provide sufficiently effective or stringent implementation and enforcement mechanisms. Consequently, the implementation of many of these obligations, in addition to their legal character, depends upon states' political will, international cooperation, implementation capacity, and monitoring arrangements, thereby imposing serious limitations on the full and effective realization of intergenerational equity. Second, a structural conflict persists between states' short-term economic-development objectives and the long-term requirements of environmental protection. Many states, particularly developing countries, continue to prioritize immediate economic growth and the satisfaction of the current needs of their populations, which may weaken the full implementation of long-term environmental commitments. Third, substantial differences among countries in levels of development, economic capacity, and implementation capability create significant challenges for the uniform and coordinated implementation of environmental obligations at the global level (7, 18).

Furthermore, international environmental law has established a framework for recognizing and protecting the rights and interests of future generations through a combination of normative, institutional, procedural, interpretive,

and financial instruments. Although this legal system has not yet fully and explicitly recognized the rights of future generations through hard and binding rules, it has progressively incorporated intergenerational reasoning into the legal architecture of environmental protection through the gradual development of principles, treaties, international practices, and implementation mechanisms, thereby transforming the future into a fundamental consideration in environmental policymaking and decision-making. First, normative instruments constitute the most important framework for recognizing the interests of future generations. The development of fundamental principles of international environmental law, including sustainable development, the precautionary principle, the prevention principle, the principle of reasonable and equitable use of natural resources, and the principle of common but differentiated responsibilities, has contributed to ensuring that environmental decisions are not based exclusively on the needs of the present generation but also take into account their long-term consequences for future generations. Concepts such as the “common heritage of humankind,” the “sustainable use of natural resources,” and the “protection of environmental systems” are similarly based on the idea that natural resources and the environment do not belong exclusively to the present generation and that future generations possess legitimate interests in benefiting from them. In addition, international treaties and major environmental instruments, although sometimes only indirectly, emphasize the need to preserve environmental capacities for the future and thereby provide a normative foundation for protecting intergenerational equity. Second, institutional instruments play an important role in indirectly representing the interests of future generations. Because future generations cannot participate directly in international decision-making processes or defend their own rights and interests, international environmental institutions perform an indirect representational function. Institutions such as the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the World Meteorological Organization (WMO), the Intergovernmental Panel on Climate Change (IPCC), and the secretariats and specialized bodies established under environmental conventions contribute to long-term decision-making by collecting and disseminating scientific information, producing expert reports, monitoring environmental conditions, evaluating state performance, and issuing policy recommendations. Scientific assessments concerning climate change have been particularly influential in shaping international climate policies and obligations and in strengthening future-oriented approaches within international environmental law. Third, procedural instruments facilitate more effective implementation of environmental obligations by creating implementation and supervisory mechanisms. Periodic reporting systems, mechanisms for monitoring and evaluating states’ commitments, information exchange, technology transfer, consultation and technical and scientific cooperation among states, periodic meetings of Conferences of the Parties (COPs), and mechanisms for collective review of state performance are among the most important procedural instruments. By strengthening transparency, accountability, and continuous oversight of state conduct, these mechanisms promote greater consideration of the long-term consequences of environmental decisions and the interests of future generations. Fourth, interpretive instruments have also played a substantial role in developing protection for the interests of future generations. International courts and judicial and quasi-judicial bodies, treaty-monitoring committees, and specialized international institutions have progressively incorporated considerations of intergenerational equity into the interpretation and application of international legal rules through dynamic and purposive interpretations of environmental instruments. Likewise, reliance on general principles of law, recognition of the relationship among a healthy environment, sustainable development, and human rights, and evolutionary interpretation of treaties have contributed to making the protection of future generations an increasingly important criterion in interpreting states’ environmental obligations. Overall, intergenerational equity

within international environmental law is undergoing a transition from an ethical and normative principle toward an emerging legal rule. Developments in customary law, treaty law, human rights law, and general principles of law all contribute to strengthening its potentially binding status. Although this transformation remains incomplete and continues to face political and implementation challenges, the overall direction of the international legal system is increasingly future-oriented. Environmental crises and the necessity of protecting the future have accelerated this development. It may therefore be concluded that the normative and interpretive status of intergenerational equity has been strengthened; nevertheless, by the end of 2024, sufficient evidence did not yet exist to recognize it as a general rule of customary international law, a peremptory norm, or an independent and uniform obligation applicable to all states.

- **Adoption of a Comprehensive Convention on Intergenerational Equity:** The international community should adopt an independent treaty defining the rights of future generations and the corresponding obligations of states. Such an instrument should be accompanied by monitoring and reporting mechanisms and effective enforcement arrangements.
- **International Criminalization of Ecocide (Environmental Criminal Responsibility):** Widespread and irreversible destruction of the environment should be recognized as an international crime under the Rome Statute of the International Criminal Court. Such recognition could permit the prosecution of responsible public officials and corporate executives. Under the existing legal framework, ecocide is not among the four categories of crimes listed in Article 5 of the Rome Statute, and its inclusion would therefore require amendment of the Statute and agreement among the States Parties.
- **Strengthening the Evidentiary Standard in Ecocide Cases:** In order to enhance the feasibility of proving ecocide, “severe, widespread, and long-term harm to vital ecosystems” should be defined as a principal threshold. The use of scientific climate data and international reports as reliable evidence should also be formally recognized. Any such proposal must comply with the principle of legality in criminal law, provide precise definitions of the material and mental elements of the offense, and clearly specify the applicable thresholds for severe, widespread, or long-term damage.
- **Establishment of an International Environmental Court or Specialized Environmental Chamber:** A specialized judicial body should be established to adjudicate environmental crimes and intergenerational disputes. Such an institution could play an important role in improving the effectiveness of international environmental law enforcement.
- **Strengthening Preventive and Precautionary Obligations:** States should be required to take action before irreversible harm occurs. The content, scope, and conditions governing reliance on the precautionary principle should be clarified and strengthened more precisely through treaties and judicial practice.
- **Institutionalization of Representation for Future Generations:** The establishment of an “Ombudsperson or Trustee for Future Generations” at both national and international levels is necessary. Such an institution could intervene in decision-making processes and environmental complaints in order to represent future interests.
- **Development of the Human Rights Dimension of Intergenerational Equity:** The right to a healthy environment should be further developed in connection with the rights to life and health. Strengthening this relationship may increase the legally binding character of intergenerational obligations. The recognition of

the right to a clean, healthy, and sustainable environment at the international level represents an important development, although such recognition does not, by itself, constitute a binding treaty obligation.

- **Strengthening Long-Term and Results-Oriented Treaty Obligations:** Treaties should establish specific quantitative targets and timelines for reducing environmental harm. Such obligations should be measurable and capable of forming the basis of legal claims and judicial review.
- **Reforming the Responsibility Regime Applicable to Multinational Corporations:** Corporations should bear direct responsibility for intergenerational environmental harm and should be held accountable on the basis of clearly defined rules concerning attribution, causation, fault or knowledge of risk, and reparation. “Awareness of long-term risk” may constitute one factor in assessing responsibility but should not, in all cases, be regarded as sufficient by itself to establish liability.
- **Strengthening Environmental Education and Ecological Literacy:** Environmental education should be made compulsory at all levels of education and explicitly connected with the rights and interests of future generations. Such measures can institutionalize a culture of intergenerational responsibility within society.

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Authors' Contributions

All authors equally contributed to this study.

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Ethical Considerations

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Transparency of Data

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