

The Evolution of the Principle of Intergenerational Justice in Light of the Requirements of International Environmental Law from 1972 to 2024

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Abstract

Intergenerational justice, as a concept concerned with the rights and interests of future generations, emphasizes the necessity of responsible use of natural resources and environmental protection. This concept entered international environmental law through the Stockholm Conference of 1972 and, by 2024, had been developed in major instruments such as the Rio Declaration of 1992, the United Nations Framework Convention on Climate Change, the Kyoto Protocol, the Paris Agreement, and the Convention on Biological Diversity. Using a descriptive-analytical research method, this study examines how these instruments, through the establishment of state obligations, legal frameworks, and mechanisms of international cooperation, provide the basis for future generations' access to minimum standards of living and sustainable natural resources. The findings indicate that the principle of intergenerational justice requires the obligations of international environmental law to regulate development and the exploitation of natural resources in such a way that the rights of future generations are protected and a balance of interests between generations is maintained. Through the creation of state obligations and mechanisms of international cooperation, these instruments have played a role in ensuring minimum environmental standards for future generations. The main contribution of this study is that, by providing a systematic analysis of the historical and legal trajectory of the requirements arising from international environmental instruments between 1972 and 2024, it enables a more precise evaluation of the extent to which these requirements have affected intergenerational justice and offers a theoretical foundation for developing and strengthening the status of this principle in international environmental law. However, practical and empirical evidence shows that, given the soft-law nature of international environmental law, it has not been able to adequately safeguard and protect the principle of intergenerational justice. Moreover, the adoption of a "Comprehensive Convention on Intergenerational Justice" and the international criminalization of "ecocide" in the Statute of the International Criminal Court, or the establishment of a specialized environmental court, are proposed as measures to strengthen the enforceability of this principle.

Keywords: intergenerational justice, international environmental law, legal obligations, sustainable development, conventions and agreements from 1972 to 2024

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1. Introduction

The question of justice in every society and in every historical period has occupied the minds of philosophers for more than two thousand years; however, its extension to intergenerational justice is relatively recent. This issue has undoubtedly emerged due to growing concerns over the past three or four decades regarding the possibility of a serious depletion of the Earth's resources and damage to the environment. Many believe that our current conduct violates the "rights" of future generations in a way that calls into question certain principles of distributive justice between generations. Despite increasing warnings about environmental degradation, biodiversity loss, and climate change, international environmental law has so far failed to provide sufficient and effective solutions for addressing these crises (Adelman, 2021; De Lucia, 2023). This failure stems from the anthropocentric structures of international law, which prioritize human interests, especially economic interests, over environmental interests and treat the environment as an object or economic commodity (Gear, 2017). Moreover, the subjects of international environmental law have often been limited to particular groups of human beings, in such a way that racial, gendered, and ableist patterns are prominent within it (Jones, 2021; Natarajan & Dehm, 2022).

This anthropocentrism has affected many foundational principles of international environmental law, including the principle of sustainable development, human rights and the environment, the principle of the common heritage of humankind, and the rules relating to the law of the sea. Accordingly, intergenerational justice and the protection of future generations have been presented as one of the principal objectives of international environmental law, yet their practical implementation faces numerous legal limitations and challenges. The concept of future generations, which was first formally raised in the 1972 Stockholm Declaration, emphasizes environmental protection for the benefit of subsequent generations. Over time, this concept has increasingly entered the agenda of international law and has been reflected in key instruments and treaties such as the 1992 Rio Conference, the United Nations Framework Convention on Climate Change (UNFCCC 1992), the 1997 Kyoto Protocol, and the 2015 Paris Agreement (Brown Weiss, 2013; United Nations, 1972). This trend indicates the attention of the international community to the necessity of realizing intergenerational justice in the management of natural resources and environmental protection. Environmental law is an important instrument for monitoring, protective measures, and the management of sustainable development. This body of law directly affects the formulation of policies concerning the exploitation of natural resources and the protection of the environment (Dehm, 2020). International declarations, including the Rio Declaration and Agenda 21, have emphasized the need to protect the environment and integrate the concept of sustainable development, and have proposed the establishment of the Commission on Sustainable Development. By setting out principles and obligations for states, these instruments have directed the path of international environmental law toward intergenerational justice. Over the past four decades, the requirements of international environmental law, with a focus on future generations, have included ecosystem protection, the reduction of greenhouse gas emissions, the sustainable use of natural resources, and the transfer of technology to developing countries. These requirements have been specified in global and regional treaties, such as the United Nations Convention on the Law of the Sea (UNCLOS 1982 and subsequent additions), treaties on the protection of species and habitats, and European Union agreements in the fields of climate change and the environment (Jones, 2021; Natarajan & Dehm, 2022).

Nevertheless, critical analysis shows that many concepts of intergenerational justice and future generations remain anthropocentric and do not include non-human species and ecosystems. This anthropocentrism is part of the inefficacy of international environmental law in confronting climate change and the degradation of natural resources. In addition, gender, racial, and social limitations in the implementation of intergenerational justice are also visible in international instruments (Jones, 2021; Urzola Gutierrez, 2023). Recent studies emphasize the need to integrate Indigenous, non-Western perspectives and concepts of future generations. Indigenous perspectives, which include both the human and the non-human, can help reduce anthropocentrism and address social, racial, and gendered limitations in international environmental law (Gear, 2017; Natarajan & Dehm, 2022). However, transferring these concepts into the framework of international law faces limitations,

because this body of law has largely been formulated within a Eurocentric paradigm and overlooks the deep connection between Indigenous knowledge and place.

Environmental law, as a key instrument of monitoring and protection, enables the formulation of requirements under international law. These requirements include the responsibility of the present generation to use resources sustainably, the obligation to prevent environmental harm, the duty of international cooperation, and the provision of transparent reports to global organizations. In addition, international conventions and protocols have established obligations for states through which intergenerational justice and the protection of future generations are operationalized. In the period from 1972 to 2024, the evolution of international environmental law reflects a global effort to integrate sustainable development, reduce environmental harm, and support future generations. Although these developments have been significant, serious challenges remain in relation to anthropocentrism, the unequal distribution of the impacts of climate change, and social and racial limitations (Adelman, 2021; Ramezani Qavam-Abadi & Shafiqfar, 2016).

Therefore, the main objective of this study is to show the extent to which the requirements of international environmental law have been able to operationalize sustainable development, the protection of natural resources, and the reduction of environmental impacts on future generations. These requirements include states' obligations to reduce greenhouse gas emissions, protect ecosystems, use natural resources sustainably, transfer technology, and cooperate internationally. Through comparative and legal analysis, this study examines the evolution of these requirements from their inception to 2024 and shows how international conventions, protocols, and agreements have strengthened the principle of intergenerational justice in states' environmental policies and measures. The present study also addresses the practical and theoretical limitations and challenges in implementing intergenerational justice. These limitations include the anthropocentrism of laws, the focus on the economic interests of the present generation, the unequal distribution of the effects of climate change, and the lack of binding mechanisms for protecting future generations. The critical analysis of this study also shows how Indigenous, gender-based, and environmental perspectives can contribute to the enhancement of intergenerational justice and the reduction of existing limitations. In general, the main question of this research is as follows: What effect have the requirements of international environmental law had on the realization of the principle of intergenerational justice in the period from 1972 to 2024? Answering this question can clarify the path for formulating more effective policies and laws for the protection of future generations and the environment.

2. Theoretical Foundations

2.1. Definition of the Principle of Intergenerational Justice

The principle of intergenerational justice means the responsibility of present generations toward future generations; that is, today's decisions and conduct must be adopted in such a way that the welfare and interests of future generations are not endangered and they have the possibility of enjoying a quality life and fair use of resources (Barry, 1995). One of the fundamental challenges in realizing intergenerational justice is the impossibility of complete equality among generations, because time moves forward and future generations cannot change the conditions of the present generation, whereas the present generation can have either a positive or negative effect on their welfare. This temporal direction, sometimes referred to as the "arrow of time," creates a logical limitation that distinguishes intergenerational justice from justice among contemporaneous generations.

Theorists such as John Rawls and Barry have paid attention to policies for protecting the interests of future generations, but these policies are not formed solely on the basis of principles of justice; rather, they are more often grounded in motivations, human concerns, and individuals' natural sense of responsibility toward later generations (Barry, 1995). In Rawls's theory, the principle of "just savings" is formed on the basis of human beings' inclination to care for future generations and a sense of humanitarian concern, not merely on the basis of pure justice (Barry, 1995).

Kristin Shrader-Frechette, by introducing the "principle of prima facie political equality," has attempted to fill the gaps in traditional theories and define intergenerational environmental justice on the basis of this principle. Environmental justice, both as a legal concept and as a social movement, seeks to distribute the burdens of pollution, harmful development, and resource

depletion equally among generations and individuals. This approach creates a rational and equality-based duty toward future generations and distinguishes it from merely moral or emotional duties (De Shalit, 1995).

From the perspective of Hume and moral philosophers, empathy and human sentiments decrease as temporal or spatial distance increases, and only justice, through its analytical and legal force, can be obligatory and universal. Within this framework, moral principles and intergenerational affection may encourage individuals to care for future generations, but justice, on the basis of general and rational rules, creates a binding duty for everyone (Barry, 1995; De Shalit, 1995).

Avner de-Shalit has introduced a concept called the “transgenerational community,” which regards future generations as actual members of society and grounds intergenerational justice in rational interests and collective identity, rather than merely affection or emotional attachment. This transgenerational community includes three features: everyday interaction, cultural interaction, and recognition of “moral similarity” with future generations, the last of which is the most important component because it involves rational thought and choice and includes future generations in today’s decision-making. By considering future generations as members of society, current decisions must observe the principles of justice and ensure the welfare of future generations (De Shalit, 1995). Despite the advantages of this approach, certain criticisms exist. For example, on the basis of critical analysis, intergenerational justice in de-Shalit’s sense applies only to the future generations of the same society and does not pay sufficient attention to the welfare of future generations in other societies. Nevertheless, de-Shalit shows that even if every society observes justice toward its own future generations, this action will have a global effect overall, because all societies are encouraged to act justly toward their later generations (De Shalit, 1995).

The definition of the principle of intergenerational justice in international law includes three fundamental components. First, the principle of conservation of options, which emphasizes the preservation of the diversity of natural and cultural resources so that future generations have sufficient options to solve their problems and meet their needs and enjoy a share of resources comparable to that of past generations (Brown Weiss, 2013). Second, the principle of quality, which states that the present generation must preserve the quality of the environment and resources and not transfer them to the next generation in worse condition, while also enabling the development and progress of future generations (Brown Weiss, 2013). Third, the principle of equitable access, which expresses the right of the present generation to use resources, provided that such access does not prevent fair use by other members of the present generation and future generations (Brown Weiss, 2013). Therefore, in international law, the principle of intergenerational justice means that every generation must act in such a way that the next generation is not harmed by the consequences of the present generation’s actions and can enjoy the right to live in a healthy environment, sufficient resources, and favorable conditions for social and economic development. This principle also includes international responsibilities for preventing environmental degradation and the unfair exploitation of shared natural resources, such as oceans, water resources, and genetic resources, which are passed on to later generations (Brown Weiss, 2013). The principle of intergenerational justice has been recognized in international instruments, such as human rights instruments, environmental conventions, and the fundamental principles of the right to development, and reflects an ethical and legal obligation for member states to take the rights of future generations into account in national and international decisions (Ramezani Qavam-Abadi & Shafiqfar, 2016). This principle also emphasizes that responsibility for protecting resources and the environment extends beyond national borders, because the effects of environmental degradation and the unbalanced exploitation of resources can affect the welfare and rights of future generations in other countries as well. Accordingly, intergenerational justice means trusteeship over resources, ensuring environmental quality, preserving options, and guaranteeing fair access for future generations; the present generation is obliged to use natural resources in such a way that the burden of the present generation’s errors and negative consequences does not fall on future generations, but rather equal opportunities for development and welfare are provided for them (Brown Weiss, 2013; Ramezani Qavam-Abadi & Shafiqfar, 2016).

2.2. *Legal and Substantive Characteristics of the Principle of Intergenerational Justice*

Intergenerational justice is a foundational legal concept that concerns relations between present generations and future generations and, in substance, differs fundamentally from justice among individuals of the same generation. These differences are reflected in the legal characteristics of this principle and constitute the basis of the present generation’s legal obligations

toward persons who have not yet been born but for whom meaningful interests and rights can be conceived. First, intergenerational justice is characterized by the absence of “direct exchanges” between non-contemporaneous generations. Future generations cannot respond to the present generation in the same way or exchange benefits with it, and such relations lack simultaneous reciprocal cooperation. Nevertheless, the present generation can, through the effects of its actions and policies, transmit benefits or harms to future generations, an issue that has been addressed in the literature of international law through concepts such as “intergenerational obligations” (Brown Weiss, 2013; United Nations General Assembly, 2013). This lack of symmetry in exchange gives intergenerational justice a legal character that requires the present generation to be accountable for the long-term consequences of its decisions, even though future generations cannot directly affect prior actions.

Furthermore, one of the most important components of intergenerational justice is the asymmetry of power between the present generation and future generations. The present generation has a significant capacity to determine and alter the living conditions, demands, and potential interests of future generations, whereas future generations have no effective capacity to influence the welfare and conditions of the present generation (Brown Weiss, 2013; United Nations General Assembly, 2021). From a legal perspective, this asymmetry means that the present generation has specific duties toward future generations, not merely moral obligations. Policies that justify the short-term exploitation of natural resources may limit the options of future generations and reduce their opportunities to achieve living standards comparable to those of the present generation, unless the international legal system is designed in a way that guarantees the rights of future generations (Dworkin, 1984; United Nations General Assembly, 2022).

In addition, intergenerational justice rests on the fact that the existence, number, and identity of future generations depend to a large extent on the decisions and actions of the present generation. Current decisions can determine who will come into existence and shape the genetic conditions and time of birth of many future persons, such that the present generation affects not only the quality of future life but also the very existence of future generations (De Shalit, 1995; Mackie, 1984). This existential dependence means that the present generation must take the legal dimensions of future generations into account in its decision-making, because its actions can determine not only welfare, but also the existence or non-existence of a particular future. Alongside these issues, intergenerational justice requires attention to the rights of future generations. According to the interest theory of rights, rights may be grounded in the interests of persons who will exist in the future, even if they cannot directly exercise those rights (Brown Weiss, 2013; Dworkin, 1984). On this basis, intergenerational justice requires the present generation to consider the interests and rights of future generations in its laws and policies, because its actions can either violate or realize those rights (Dworkin, 1984).

One of the most complex substantive characteristics of intergenerational justice is the problem of existential dependence and the non-identity of future generations, which arises from the dependence of future persons’ existence on the decisions of the present generation. This problem creates challenges in defining the harm and benefit of the present generation’s actions, because many of our actions affect not only living conditions but also the identity of those who will actually exist (De Shalit, 1995; Mackie, 1984). In critiquing and analyzing this problem, a distinction must be made between person-affecting and impersonal views: the person-affecting view holds that our actions have legal significance only when they affect those who actually exist or will exist, whereas the impersonal view evaluates the value of states of affairs independently of existing persons (Mackie, 1984). Another characteristic of intergenerational justice is the limitation of knowledge regarding future generations. We cannot know the precise identity of future persons and can only predict the probable consequences of actions and policies, often under conditions of uncertainty (Brown Weiss, 2013). This epistemic limitation requires intergenerational justice to be grounded in general, precautionary, and foreseeable legal and ethical principles so that the obligations of the present generation toward future generations are guaranteed, even when uncertainty exists regarding outcomes.

2.3. *The Concept and Characteristics of Sustainable Development*

The early roots of the close relationship between nature conservation, or prudent resource management, and economic development—which lies at the heart of sustainable development—date back to the eighteenth and nineteenth centuries (Knight, 1977). However, the modern understanding of this concept and its recognition at the level of the international

community are largely the result of an extensive effort led by the United Nations. This effort formally began in 1972 with the Stockholm Conference on the Human Environment. Although the term “sustainable development” had not yet been introduced at that time, the link between environmental protection and economic development was clearly identified in the principles of the Stockholm Declaration (United Nations, 1972). Around fifteen years later, the term “sustainable development” was formally introduced and its initial meaning was formulated in the Brundtland Report. The most important turning point in the history of sustainable development was undoubtedly the 1992 Rio Conference on Environment and Development and its well-known declaration, which brought sustainable development into the legal domain. Although the principles of this declaration were not binding, they were drafted in strong legal language and referred to sustainable development in several principles (Ramezani Qavam-Abadi & Shafiqfar, 2016; Shaw, 2013). Thus, the Rio Declaration is regarded as the conceptual cornerstone of sustainable development. At Rio, sustainable development, which was formally accepted by the international community, became an unavoidable model for relations between environment and development. However, it was only in 1997, at the Rio+5 Summit, that the social dimension was added to this concept, when the United Nations General Assembly emphasized that environmental protection, economic development, and social development are three interdependent dimensions of sustainable development (United Nations General Assembly, 2013). This rebalancing of the concept was later reaffirmed at the 2002 Johannesburg Summit and, together with an emphasis on implementation, constituted the principal added value of that summit. If the main instruments are examined, it can be said that the meaning of sustainable development is a combination of two foundational principles: intergenerational justice and intragenerational justice. Intergenerational justice, which refers to the “sustainable” dimension, is reflected in the Brundtland Report as well as in Principle 3 of the Rio Declaration, and states that governments must preserve their environmental capital for future generations and transfer it in a condition similar to that in which they received it (Brown Weiss, 2013; Ramezani Qavam-Abadi & Shafiqfar, 2016).

In other words, environmental protection is necessary to guarantee justice among generations, and without it, sustainable development cannot be realized. Intragenerational justice relates to the “development” dimension and emphasizes the equitable distribution of the benefits of development within a generation, whether at the domestic level of a country or between countries (Ramezani Qavam-Abadi & Shafiqfar, 2016). Only when these two principles are integrated does the term “sustainable development” acquire its meaning and distinctive character. Development will be sustainable only when both intergenerational justice, meaning environmental protection, and intragenerational justice, meaning equitable economic and social development, are guaranteed and operationalized through integration. This integration is clearly expressed in Principle 4 of the Rio Declaration, according to which, in order to achieve sustainable development, environmental protection must constitute an integral part of the development process and cannot be considered in isolation (Ramezani Qavam-Abadi & Shafiqfar, 2016; Shaw, 2013). This integration of environmental protection with economic and social development forms the central philosophy of sustainable development, and some regard it as equivalent to sustainable development itself, although such a view is restrictive. Sustainable development is a goal toward which the international community must strive, and the integration of environment with economic and social development is the means of achieving that goal.

It is therefore clear that sustainable development has widely penetrated treaty law.

Nevertheless, unlike non-binding instruments such as the Rio Declaration, the drafting of provisions on sustainable development in binding international treaties can be relatively flexible. The wording may be vague and imprecise, conditional formulations are often used, and these provisions frequently resemble encouragement more than explicit limitation. For some, because of this flexibility, such provisions cannot generate valid rules of international law. However, the softness of an obligation contained in a treaty provision should not prevent its validity and binding legal character. It has been argued that the ambiguity or limited character of the obligation in certain treaty provisions has no bearing on their legal nature. It has also been stated that many treaty provisions that create encouragement, such as those in which parties undertake to “strive for” or “promote” something, are themselves complete legal rules; they constitute valid norms of international law (Virally, 1968). Accordingly, the softness of provisions relating to sustainable development does not prevent them from being valid normative propositions; rather, it merely expands the scope of discretion of the parties in implementing their obligations (Virally, 1968).

3. The Background to the Emergence and Formation of the Principle of Intergenerational Justice

The principle of intergenerational justice, as one of the emerging and foundational concepts of contemporary international law, is the product of a gradual transformation of ethical, philosophical, and legal ideas concerning the relationship between generations and the responsibility of the present generation toward future generations. This principle rests on the idea that future generations, although not yet born, have legitimate interests that must be taken into account in the current decision-making of states and human societies. The formation of this principle in international law cannot be limited to a single instrument or specific point in time; rather, it must be understood as the result of a historical and conceptual process that gradually moved from the level of ethical thought into the domain of legal norms.

The intellectual roots of intergenerational justice can be traced to moral philosophy and classical theories of justice. Philosophers such as Aristotle, although they did not explicitly speak of future generations, provided a theoretical basis for responsibility toward posterity through the concept of distributive justice and the emphasis on balance and moderation in the use of resources. In the modern period, ideas such as social contract theory and the concept of the common good indirectly led to the idea that the long-term interests of society should not be sacrificed to the transient interests of the present generation. Nevertheless, until the twentieth century, these debates remained largely within the realm of ethics and political philosophy and were rarely translated into legal language. The advent of the Industrial Revolution and the expansion of extensive exploitation of natural resources revealed the first signs of conflict between short-term and long-term interests. Environmental degradation, widespread pollution, and the depletion of natural resources raised the fundamental question of whether the present generation has the right, through excessive consumption, to limit the ability of future generations to meet their needs. These concerns gradually became more prominent in the scientific and political discourses of the twentieth century and prepared the ground for the entry of the concept of intergenerational justice into international law.

After the Second World War and the establishment of the United Nations, the concept of the shared responsibility of humankind toward peace, security, and global welfare took on a more coherent form. Although the United Nations Charter does not explicitly refer to intergenerational justice, its emphasis on “future generations” in the preamble to the Charter is the first indication of international law’s attention to the link between the present and the future. This phrase, although symbolic, reflects a new understanding of the responsibility of states beyond the temporal boundaries of the present generation. The 1960s and 1970s constituted a turning point in the formation of the principle of intergenerational justice. Growing global concerns about environmental crises, population explosion, and the limits of natural resources revealed the need to rethink development models. In this context, intergenerational justice emerged as a conceptual response to new challenges. The 1972 Stockholm Conference on the Human Environment was the first international instrument that implicitly and then explicitly considered the responsibility of the present generation toward future generations. This conference brought intergenerational justice from the level of ethical thought into the arena of international legal discourse.

In the following decades, the concept of sustainable development was introduced as a comprehensive framework for integrating economic growth, social justice, and environmental protection. The well-known definition of sustainable development as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” is a clear embodiment of intergenerational justice. This concept transformed intergenerational justice into one of the main pillars of global policymaking and strengthened its position in international law.

Simultaneously with these developments, theorists of international law sought to formulate intergenerational justice in legal terms. The works of scholars such as Edith Brown Weiss, through the idea of “planetary trust,” played an important role in explaining the obligations of the present generation toward global common resources. According to this view, the present generation is not merely the owner of natural resources, but rather their trustee for future generations. This theory created a bridge between ethics and law and contributed to strengthening the legal foundations of intergenerational justice. In international law, intergenerational justice first appeared largely in the form of soft and non-binding principles. International declarations, resolutions, and policy instruments gradually introduced the language of intergenerational justice into legal texts. Although these instruments lacked direct legal force, they played an important role in shaping normative expectations and interpreting the obligations of states. Over time, this principle emerged as an interpretive criterion in international environmental law and human rights law. In recent decades, with the intensification of global crises such as climate change, biodiversity loss, and widespread pollution, intergenerational justice has moved from a theoretical concept to a practical

necessity. These developments have led courts and quasi-judicial bodies to pay attention to this principle and take it into account in interpreting fundamental human rights and states' environmental obligations. Thus, intergenerational justice has gradually acquired a practical position in international law. Therefore, the background to the emergence and formation of the principle of intergenerational justice in international law reflects a gradual movement from ethics to law and from policymaking to adjudication.

4. The Requirements of International Environmental Law Concerning the Principle of Intergenerational Justice (1972–2024)

4.1. The 1972 Stockholm Conference and the Declaration on the Human Environment

The United Nations Conference on the Human Environment, held in Stockholm in 1972, is regarded as the first serious turning point in the entry of the idea of responsibility toward future generations into international environmental law. Although the Stockholm Declaration does not explicitly use the term “intergenerational justice,” its conceptual and normative structure is such that it clearly contains the legal foundations of this principle. As emphasized in contemporary literature on intergenerational justice, concern about the long-term consequences of human activities and the transfer of a healthy environmental heritage to posterity gradually shifted, in the final decades of the twentieth century, from an ethical concern to a legal demand (Brown Weiss, 2013). By emphasizing that human beings are both the “creature” and the “moulder” of their environment, the Stockholm Declaration establishes an inseparable link between the welfare of the present generation and the quality of life of future generations. This view reflects the same understanding: that human beings are a temporary link in a continuous chain of generations and that their decisions have cumulative and sometimes irreversible effects on the future (Brown Weiss, 2013). Within this framework, the environment is not merely a source for economic exploitation, but rather a trust that each generation receives from the past and is obliged to preserve for posterity.

Principle 1 of the Stockholm Declaration, which recognizes the human right to “life in an environment of a quality” adequate for dignity and well-being, can conceptually be extended to future generations. If this right were limited solely to the present generation, the philosophy of environmental protection would lose its meaning (Brown Weiss, 2013). In the same direction, Principle 2 of the Stockholm Declaration emphasizes the protection of the natural resources of the Earth—including air, water, land, flora, and fauna—for the “benefit of present and future generations.” This direct statement is one of the first explicit recognitions of the interests of future generations in an international instrument with ethical binding force. This principle is consistent with the theory of “intergenerational trusteeship,” later systematically developed by Brown Weiss, according to which each generation holds natural resources not as an absolute owner, but as a trustee (Brown Weiss, 2013).

Principle 3 of the Stockholm Declaration, which addresses the Earth's capacity to produce renewable resources, shows that international lawmakers were aware from the outset of ecological limits and the danger of the erosion of natural capital. This concern is precisely the same concern raised regarding “natural capital” and the need to preserve it as one form of intergenerational capital. On this basis, intergenerational justice requires the present generation to avoid the excessive consumption of non-renewable resources and the irreversible destruction of ecosystems. The Stockholm Declaration also refers in Principles 5 and 6 to the dangers arising from severe pollution and toxic substances and calls upon states to prevent serious or irreversible environmental harm. These principles may be understood as a precursor to the precautionary principle, which was explicitly articulated in later environmental instruments. From the perspective of intergenerational justice, the precautionary principle is an important legal instrument for protecting the rights of future generations, because it prevents scientific uncertainty from being used as an excuse for delaying protective measures (Brown Weiss, 2013).

One of the essential points in the English literature is the critique of the view that denies the rights of future generations because of their “present non-existence.” Without entering into these philosophical debates, the Stockholm Declaration practically sets aside this critique and, by recognizing the interests of posterity, obliges states to make decisions with a long-term perspective. This approach is consistent with the idea of the “two-hundred-year present,” which treats the boundary between present and future as fluid and directly links today's responsibilities to the lives of children and grandchildren. In the Stockholm Declaration, economic development is also not treated as separate from environmental protection. Principle 8 emphasizes the necessity of economic and social development for improving human quality of life, but this development must

be compatible with environmental protection. This view laid the groundwork for the concept of sustainable development, which was later formally defined in the 1987 Brundtland Report. From the perspective of intergenerational justice, development is just only when it does not weaken the ability of future generations to meet their own needs (Ramezani Qavam-Abadi & Shafiqfar, 2016).

Principle 21 of the Stockholm Declaration, which emphasizes the sovereign right of states over their natural resources while also emphasizing their responsibility to prevent damage to the environment of other states or areas beyond national jurisdiction, strengthens the intergenerational dimension of responsibility. Many environmental harms, such as climate change, are transboundary and intergenerational in nature, and their effects fall most heavily on future generations. Overall, the 1972 Declaration on the Human Environment can be regarded as the first international instrument to coherently lay the legal foundations of intergenerational justice. By integrating ethical, scientific, and legal considerations, the Declaration created a framework in which environmental protection is treated as a continuing obligation toward future generations. As emphasized in the relevant literature, without recognizing the rights of posterity and requiring the present generation to be accountable, no legal system can effectively address long-term environmental crises (Brown Weiss, 2013).

Accordingly, the 1972 Stockholm Conference should be regarded as the starting point for the transformation of intergenerational justice from an ethical concern into a normative requirement in international environmental law—a requirement that was gradually strengthened and institutionalized in later instruments, from the 1992 Rio Declaration to contemporary climate agreements.

In the opening paragraphs of the Stockholm Declaration, the deep link between human beings and the environment is emphasized, and it is stated that both the natural environment and the human-made environment constitute the basis of well-being and the enjoyment of fundamental human rights, including the right to life. Principle 1 of the Stockholm Declaration provides that human beings have the right to freedom, equality, and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being, and that they bear a solemn responsibility to protect and improve the environment for present and future generations. This principle is one of the clearest foundations of intergenerational justice in international environmental law, because it explicitly refers to “future generations” and recalls the legal and ethical responsibility of the present generation toward them. Principle 2 of the Stockholm Declaration states that the natural resources of the Earth, including air, water, land, flora, and fauna, must be safeguarded for the benefit of present and future generations through careful planning or management. This principle is clearly consistent with the theory of “intergenerational trusteeship,” according to which each generation holds natural resources not as an absolute owner, but as a trustee for future generations. Such an interpretation provides a legal basis for limiting the excessive exploitation of natural resources (Brown Weiss, 2013; United Nations, 1972).

Principle 3 of the Stockholm Declaration addresses the Earth’s capacity to produce vital renewable resources and emphasizes the need to maintain and enhance this capacity. This principle concerns the preservation of “options” for future generations, a concept later explained by Edith Brown Weiss as one of the pillars of intergenerational justice. Preserving biodiversity, ecosystems, and the natural functions of the Earth means ensuring the ability of future generations to choose development paths compatible with their own values and needs (Brown Weiss, 2013).

Principle 4 of the Declaration recalls human responsibility to protect wildlife and natural habitats and states that this responsibility must be considered in planning for economic and social development. This principle reflects an effort to create a balance between development and environmental protection, a balance that lies at the heart of intergenerational justice. Development that leads to the destruction of habitats and species effectively weakens the quality of life of future generations.

In Principles 5 and 6, the Stockholm Declaration addresses non-renewable resources and dangerous pollution and emphasizes the need to prevent resource depletion and control pollution. These principles implicitly indicate the principle of “preserving the quality” of the planet for future generations. Preventing severe pollution of air, water, and soil benefits not only the present generation but is also an essential condition for transferring a planet of acceptable quality to future generations. Principle 7 of the Stockholm Declaration calls upon states to take the necessary measures to prevent pollution of the seas, a matter of special importance for intergenerational justice, because marine pollution has long-term and transboundary effects and can affect food resources and marine ecosystems for decades or even centuries. This principle is a clear example of the Declaration’s attention to the long temporal consequences of human activities.

In Principle 8, economic and social development is presented as a condition for improving the environment, but in a manner compatible with environmental protection. This principle is a precursor to the concept of sustainable development and shows that the Stockholm Declaration seeks a development model that meets the needs of the present generation without endangering the ability of future generations to meet their own needs. From the perspective of intergenerational justice, one of the most important achievements of the Stockholm Declaration was the transformation of ethical concerns about the future into normative obligations for states. Although the Declaration is not legally binding, its principles gradually became part of international custom and the basis of later binding instruments. Thus, intergenerational justice was elevated from a philosophical idea to part of the discourse of international environmental law. In general, the 1972 Stockholm Declaration can be regarded as the official starting point for the recognition of the legal requirements of intergenerational justice at the global level. By emphasizing human responsibility toward future generations, the protection of natural resources, the prevention of long-term pollution, and the integration of environment with development, the Declaration created a conceptual framework that was later expanded and deepened in instruments such as the 1992 Rio Declaration, environmental conventions, and climate change law. Accordingly, Stockholm is not only the cornerstone of international environmental law, but also one of the main pillars in the formation of intergenerational justice within the international legal order.

4.1.1. The Obligation to Protect the Environment for Future Generations

The 1972 Stockholm Conference represents a turning point in recognizing the obligation to protect the environment for future generations at the level of international law. This conference was held under conditions in which the cumulative effects of industrialization, widespread pollution, and excessive exploitation of natural resources had created a serious threat to the continuity of human and natural life. By linking human rights, the environment, and state responsibility, the Stockholm Declaration laid the conceptual foundation for the obligation to observe intergenerational justice, even if implicitly.

In the preamble to the Stockholm Declaration, the environment is introduced as an essential condition for the human enjoyment of fundamental rights. This approach encompasses an expansive temporal view and indicates that the right to a healthy environment is not limited to the present generation, but logically includes future generations as well. Thus, the Stockholm Declaration prepared the ground for transferring the concept of “duty toward the future” from the realm of ethics to the domain of international legal norms. Principle 1 of the Stockholm Declaration explicitly declares that human beings bear a solemn responsibility to protect and improve the environment for present and future generations. This statement is one of the first formal recognitions of intergenerational responsibility in a global instrument. This principle is consistent with the theory of “public trust,” according to which states and societies hold natural resources not as absolute owners, but as trustees for the public and for future generations (Brown Weiss, 2013).

In the domestic law of the United States, the public trust doctrine has traditionally been used to protect resources such as shores, tidal waters, and the public interests related to them. Broader interpretations of this doctrine, from the perspective of intergenerational justice, make it possible to extend the duty of protection to the interests of future generations (Brown Weiss, 2013). By expanding the public trust doctrine, environmental legal scholarship has presented it as a legal, political, and ethical framework for confronting global environmental crises, including climate change. According to this view, states have a fiduciary duty to preserve vital natural systems for the benefit of future generations, and this duty cannot be waived or ignored (Brown Weiss, 2013). This view is consistent with the spirit of the Stockholm Declaration, which considers states responsible for the rational management of natural resources.

Principle 2 of the Stockholm Declaration provides that the natural resources of the Earth must be safeguarded for the benefit of present and future generations through careful planning. This principle implicitly introduces the concept of “natural capital,” a concept later developed in theories of intergenerational justice. According to this approach, the severe depletion or irreversible destruction of natural resources amounts to transferring an environmental debt to future generations (Brown Weiss, 2013).

Edith Brown Weiss regards intergenerational justice as based on a fiduciary relationship among generations and emphasizes that every generation must preserve the options, quality, and access of future generations to natural resources. These three criteria are important analytical tools for assessing the degree to which the requirements of Stockholm have been realized.

Although the Stockholm Declaration does not express these concepts systematically, it refers, in different principles, to preserving environmental quality and preventing the restriction of future options (Brown Weiss, 2013).

Principle 3 of the Stockholm Declaration emphasizes the need to maintain the Earth's capacity to produce renewable resources. This principle indicates that today's exploitation must not weaken the ecological capacity of the planet for tomorrow. Such an interpretation is consistent with the obligation to think in long-term timeframes and requires states to consider the cumulative effects of their decisions on future generations. In the principles related to pollution, the Stockholm Declaration clearly emphasizes the responsibility of states to prevent severe and irreversible pollution. This emphasis forms the basis of the principles of prevention and precaution in international environmental law, principles that play a key role in protecting the interests of future generations (Brown Weiss, 2013; United Nations, 1972). Overall, the 1972 Stockholm Conference, by recognizing the responsibility of human beings and states toward future generations, laid the foundation for the obligation of intergenerational environmental protection in international law. This obligation, based on concepts such as public trust, preservation of natural capital, prevention of long-term harm, and rational planning, shaped the evolution of international environmental law. Although the Stockholm Declaration is not itself binding, its principles, as guiding norms, formed the basis for the development of later instruments, practices, and legal theories and transformed intergenerational justice into one of the essential pillars of international environmental law.

4.1.2. *The Obligation of States to Cooperate Internationally to Reduce Environmental Harm*

Air pollution, climate change, biodiversity degradation, marine pollution, and the destruction of the ozone layer are not phenomena that remain confined within the political borders of a single state; rather, their effects directly or indirectly affect other countries and future generations as well. This feature has transformed the necessity of international cooperation from a political choice into a legal and ethical obligation. The United Nations Conference on the Human Environment, held in Stockholm in 1972, as the first comprehensive global summit in the field of the environment, is considered the starting point for the formation of the system of international environmental law and the institutionalization of international cooperation in confronting environmental harm. This conference was convened in response to the intensification of transboundary pollution, the degradation of natural resources, and increasing scientific concerns about the consequences of industrial development, and ultimately led to the adoption of the Stockholm Declaration on the Human Environment, consisting of 26 principles. In this Declaration, for the first time, the relationship between human beings and the environment was explained within a legal-normative system, and the environment was recognized as an essential condition of human life and economic development. Within the framework of this Declaration, international cooperation was emphasized as one of the foundational pillars of environmental protection. The first principle of the Declaration recognized the human right to an environment of adequate quality for a life of dignity and simultaneously emphasized the responsibility of states and societies to protect and improve the environment. This link between right and duty became the basis for the formation of collective cooperation at the international level. On the other hand, Principle 21 of the Declaration, while confirming the sovereign right of states over their natural resources, limited this right by the obligation not to cause damage to the environment of other countries or areas beyond national jurisdiction. This principle is the cornerstone of the "no-harm principle" in international environmental law and brought cooperation among states closer to a legal obligation rather than merely an ethical recommendation (Shaw, 2013; United Nations, 1972). The Stockholm Declaration also called upon states to develop scientific, technical, and economic cooperation in confronting shared environmental challenges. In this regard, the exchange of information, scientific data, and research findings was emphasized as a precondition for effective environmental policymaking, and the necessity of coordinated action against transboundary pollution, such as air and water pollution, was affirmed. Principle 24 of the Declaration specifically emphasizes the importance of cooperation within the framework of international organizations and the conclusion of multilateral agreements to resolve global environmental problems. This reflects a transition from a purely national approach to a multilateral and collective approach in environmental management. Alongside the legal dimensions of cooperation, the Stockholm Declaration also paid special attention to developmental dimensions. Principle 9 emphasized the necessity of financial assistance and technology transfer from developed countries to developing countries and thereby laid the theoretical groundwork for the concept of "common but differentiated responsibilities." Principle 20 also highlighted the role of science and technology in sustainable environmental management and emphasized the development of joint international research. In

addition, Principle 19 emphasized the importance of education and public awareness in the field of the environment, which is itself considered a necessary condition for effective cooperation among states and societies. Institutionally, the Stockholm Conference led to the establishment of the United Nations Environment Programme (UNEP), which assumed a coordinating role in the development of international environmental policies and cooperation. As the executive arm of global cooperation, this institution prepared the ground for the formation of numerous environmental treaties in subsequent decades. Overall, by recognizing the environment as a shared and transboundary issue, the Stockholm Conference elevated international cooperation from the level of ethical recommendations to the level of legal principles and laid the foundation of the global environmental governance system.

The 1992 Rio Declaration developed this obligation and, by articulating the principle of “common but differentiated responsibilities,” highlighted the justice-oriented dimension of international cooperation. According to this principle, all countries are responsible for protecting the global environment, but the degree and nature of their obligations must differ according to their historical contribution to environmental harm and their economic and technical capacities. This approach transforms international cooperation into an instrument for redressing inequalities and preventing the imposition of disproportionate burdens on developing countries, while also taking the interests of future generations into account at the global level (Ramezani Qavam-Abadi & Shafiqfar, 2016; Shaw, 2013).

In binding international instruments, the obligation to cooperate has also been explicitly recognized. For example, the United Nations Framework Convention on Climate Change requires states, through the exchange of scientific information, technology transfer, financial resources, and coordinated measures, to protect the climate system for the benefit of present and future generations. Within this framework, international cooperation not only helps reduce greenhouse gas emissions but also enhances the capacity of countries to adapt to the inevitable effects of climate change. International environmental cooperation has multiple dimensions, including policy coordination, the development of common standards, technical and financial assistance, and the creation of international institutions for monitoring and implementation. These forms of cooperation enable countries to move beyond ineffective unilateral measures and adopt sustainable and long-term solutions. From the perspective of intergenerational justice, such cooperation ensures that the short-term interests of states are not prioritized over the right of future generations to enjoy a healthy environment (Intergovernmental Panel on Climate Change, 2013; United Nations General Assembly, 2022).

Therefore, the obligation of states to cooperate internationally to reduce environmental harm reflects the transition from the concept of absolute sovereignty to responsible sovereignty. Under this form of sovereignty, states are obliged, in exercising their rights, to take into account the effects of their actions on other countries and future generations. This obligation is a fundamental basis for the formation of a global environmental legal order whose objective is not only to resolve current crises but also to ensure ecological survival and human welfare in the long term.

4.1.3. Emphasis on Prevention and the Precautionary Principle in Confronting Environmental Threats

In the Declaration of the 1972 Stockholm Conference, the emphasis on preventing environmental harm and the gradual formation of the precautionary principle play a central role in laying the foundations of intergenerational justice. Although the term “precautionary principle” was first explicitly and systematically articulated in later instruments such as the 1992 Rio Declaration, its normative content and philosophy can clearly be identified in the principles and provisions of the Stockholm Declaration, and it may be regarded as one of the pillars of states’ obligations toward future generations.

In Principle 1, the Stockholm Declaration, by recognizing the human right to “life in an environment of a quality that permits a life of dignity and well-being,” implicitly establishes a link between environmental protection and human dignity. This right is not limited to the present generation; rather, given the long-term nature of the effects of environmental degradation, it naturally includes future generations as well. From the perspective of intergenerational justice, realizing this right requires states to adopt preventive measures before irreversible harms occur, because environmental damage is often cumulative and irreversible, and neglecting prevention leads to the unjust transfer of costs to future generations. Principle 2 of the Stockholm Declaration, by emphasizing the need to “protect, maintain, and improve the environment for present and future generations,” more explicitly recognizes the intergenerational dimension of state responsibility. This principle shows that environmental protection is a continuous and future-oriented obligation and is not limited merely to compensation after damage occurs. From

this perspective, prevention is not only a technical instrument, but also an ethical and legal requirement for observing intergenerational justice, because future generations cannot intervene in today's decisions, yet they suffer the greatest harm from present failures.

In Principle 6 of the Stockholm Declaration, states are required to prevent the discharge of toxic substances or other substances and energy that may cause "serious or irreversible damage" to the environment. This principle clearly reflects preventive logic, because its focus is on preventing harm before it occurs, not merely on subsequent compensation. From the perspective of intergenerational justice, this principle indicates that in the face of severe or irreversible risks, the absence of full scientific certainty cannot justify delay in action, an idea later recognized as the core of the precautionary principle (Brown Weiss, 2013).

Principle 7 of the Stockholm Declaration, by requiring states to take all possible measures to prevent pollution of the seas, especially pollution that harms human health, living marine resources, and legitimate uses of the seas, highlights the transboundary dimension of prevention. This principle shows that the prevention of environmental harm is necessary not only for protecting the interests of the present generation, but also for safeguarding the common resources of humankind for future generations. Within this framework, prevention functions as an instrument for preserving shared natural capital and ensuring equitable access by future generations.

Principle 15 of the Stockholm Declaration, although it does not verbally refer directly to the precautionary principle, strengthens the intellectual foundations of precaution by emphasizing rational planning and the management of natural resources in order to prevent environmental degradation. This principle indicates that development decision-makers must consider the long-term effects of their actions on the environment. From the perspective of intergenerational justice, such an approach prevents the short-term interests of the present generation from prevailing over the fundamental rights of future generations (Brown Weiss, 2013; United Nations, 1972).

An analysis of the principles of the Stockholm Declaration as a whole shows that prevention and precaution, as two sides of the same coin, are instruments for realizing intergenerational justice. Prevention concerns early action to prevent harm from occurring, and precaution concerns cautious decision-making under conditions of scientific uncertainty. Together, these two approaches ensure that incomplete knowledge or economic and political pressures do not become excuses for endangering the environmental rights of future generations. For this reason, the Stockholm Declaration may be regarded as the starting point of an international norm-making process in which the principle of prevention and the initial core of the precautionary principle were placed in the service of guaranteeing intergenerational justice in international environmental law.

4.2. *The 1992 Rio Conference and Agenda 21*

The United Nations Conference on Environment and Development, or the 1992 Rio Conference, is a fundamental turning point in the formation and institutionalization of intergenerational justice in international law and policymaking. At this conference, sustainable development was accepted for the first time as a comprehensive normative framework that simultaneously takes into account the needs of the present generation and the rights of future generations. Agenda 21, as the operational program of the Rio Conference, is a concrete manifestation of this approach and elevates intergenerational justice from the level of an ethical concept to the level of policy and institutional obligations. According to the report of the Sustainable Development in the 21st Century project, prepared under the supervision of the United Nations Department of Economic and Social Affairs, the overarching aim of this project was to draw a coherent vision of sustainable development in the twenty-first century, a vision whose roots go directly back to the achievements of the 1992 Rio Conference. This project was designed to prepare analytical content for the Rio+20 Conference in 2012 and focused specifically on evaluating the extent to which Agenda 21 and the principles of the Rio Declaration had been realized. This approach shows that Agenda 21 was not merely a temporary instrument, but a long-term program with an intergenerational horizon (Ramezani Qavam-Abadi & Shafiqfar, 2016; United Nations General Assembly, 2013).

In the Rio Declaration, especially Principles 3 and 4, it is stated that "the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations," and that "environmental protection shall constitute an integral part of the development process." These principles consolidate the theoretical foundation of intergenerational justice in international environmental law and are directly reflected in the structure and content of Agenda

21. They also cover areas such as natural resource management, patterns of consumption and production, poverty eradication, ecosystem protection, and the role of social groups, all of which are long-term and future-oriented in nature. Sustainable development policy instruments emphasize that Agenda 21 was designed for the integrated implementation of the sustainable development agenda and that its objective was to create a balance among economic growth, social justice, and environmental protection over time. This balance is the essence of intergenerational justice, because without it, the short-term interests of the present generation can irreversibly weaken the environmental and developmental capacities of future generations (Brown Weiss, 2013; Ramezani Qavam-Abadi & Shafiqfar, 2016).

Within the framework of Agenda 21, the anthropocentric principle of sustainable development, expressed in Principle 1 of the Rio Declaration, holds a special position. According to this principle, human beings are “at the centre of concerns for sustainable development” and are “entitled to a healthy and productive life in harmony with nature.” The conceptual translation of this principle in its intergenerational dimension is that the right of the present generation to development is conditional upon preserving harmony with nature and observing environmental limits; ignoring these limits directly violates the rights of future generations. These instruments, by emphasizing the recognition of “planetary limits and boundaries,” implicitly stress the necessity of observing the principles of precaution and prevention in development decision-making. This has a clear connection with intergenerational justice, because recognizing environmental boundaries means that current exploitation of resources must not weaken the ecological capacity of the Earth to meet future needs. Scientific reports, including climate and environmental assessment reports, show that ecosystem degradation directly affects the welfare of future generations, thereby doubling the necessity of effective implementation of Agenda 21 (Intergovernmental Panel on Climate Change, 2013; United Nations General Assembly, 2021).

Institutionally, Agenda 21 emphasizes the role of states, international organizations, civil society, youth, and future generations as stakeholders in sustainable development. The participation of different social groups, especially young people, indicates implicit attention to the interests of future generations in decision-making processes. This approach elevates intergenerational justice from the level of an abstract principle to the level of a participatory and institutional process. In general, the 1992 Rio Conference and Agenda 21 can be regarded as a turning point in which intergenerational justice was consolidated as the backbone of sustainable development in the international legal and policy system. The emphasis on the needs of future generations, the recognition of environmental limits, the precautionary principle, and the link between development and environmental protection all show that Agenda 21 is not only an implementation program for the present generation, but also a long-term obligation toward future generations—an obligation that remains a basis for evaluating the performance of states and the international community in the field of sustainable development.

4.2.1. The Obligation to Sustainable Development and the Equitable Use of Resources between Generations

Sustainable development, meaning the fulfillment of the needs of the present generation without compromising the ability of future generations to meet their own needs, was one of the main axes of the United Nations Conference in Rio in 1992. After decades of debate on environmental degradation, industrial growth, and unsustainable economic development, this conference sought to provide a global framework for the management of natural resources and environmental protection. One of the most important outputs of this conference was Agenda 21, which provided a comprehensive operational program for sustainable development in the twenty-first century. One of the foundational principles of Agenda 21 is the obligation to use natural resources equitably between generations. This principle is grounded in the concept of intergenerational justice, meaning that natural resources such as water, soil, forests, and renewable and non-renewable energy resources must be managed in such a way that not only the present generation but also future generations can benefit from them. Principle 2 of the Rio Declaration also emphasizes this issue: states have the right to exploit their resources pursuant to their own environmental and developmental policies, but at the same time they have the responsibility to ensure that their activities do not cause damage to the environment of other states or areas beyond national jurisdiction. This principle shows the delicate balance between national sovereignty and international responsibility (Ramezani Qavam-Abadi & Shafiqfar, 2016; Shaw, 2013).

Sustainable development in Agenda 21 is not merely a theoretical idea, but an operational framework that presents specific policies and actions. For example, this instrument proposes that natural resource management should be based on environmental impact assessment, respect for the right of access to resources for all groups, and the protection of biodiversity. The equitable

use of resources between generations requires long-term planning and the adoption of flexible and multilateral policies that simultaneously take into account the economic, social, and environmental effects of exploitation (Brown Weiss, 2013; Ramezani Qavam-Abadi & Shafiqfar, 2016).

A principled analysis of the Rio Declaration shows that sustainable development faces challenges. First, there is a conflict between national interests and the interests of future generations; countries may, under the pretext of immediate economic growth, overextract their resources and harm later generations. Second, the transboundary impacts of resource exploitation, such as climate change caused by greenhouse gas emissions, require international cooperation. As expressed in Principle 2 of the Rio Declaration, states are responsible for ensuring that their activities do not harm areas outside national jurisdiction, but proving this responsibility in practice is difficult because of scientific and political complexities (Farshasaedi & Issazadeh, 2015; Shaw, 2013). One practical aspect of realizing intergenerational justice is the establishment of compensation mechanisms and incentives for resource protection. Such approaches show that compliance with the principles of sustainable development can be aligned with economic interests and create financial incentives for resource protection. Similarly, this approach can be extended to other resources such as water and energy (Ramezani Qavam-Abadi & Shafiqfar, 2016).

From an analytical perspective, Agenda 21 and the Rio Declaration emphasize the necessity of integrating environmental, economic, and social principles into policymaking. Sustainable development will be incomplete without attention to intergenerational justice, because future generations will confront the consequences of irresponsible exploitation. Therefore, states must not only respect their sovereignty over resources, but also consider the transboundary and long-term effects of their decisions and use international cooperation to protect shared resources. Ultimately, it can be said that the 1992 Rio Conference and Agenda 21 formed the legal and conceptual basis of the obligation to sustainable development and the equitable use of resources between generations. However, the practical success of these principles requires strong international implementation institutions, scientific assessment of environmental impacts, and committed policymaking. Intergenerational justice will be realized only when the present generation, in its use of resources, observes scientific, social, and environmental limits and accepts its transboundary responsibility.

4.2.2. *The Obligation to Implement National Environmental Programs and Report to the Commission on Sustainable Development*

One of the key axes of Agenda 21 is the obligation of states to formulate and implement national environmental programs and submit periodic reports to the United Nations Commission on Sustainable Development. This obligation forms part of the operational mechanism for realizing sustainable development and the equitable use of resources between generations (Ramezani Qavam-Abadi & Shafiqfar, 2016; United Nations General Assembly, 2013). The purpose of this requirement is to ensure that states' environmental and developmental policies are aligned with international obligations and that their practical measures are traceable and measurable. The implementation of national environmental programs includes setting specific objectives in areas such as natural resource management, pollution reduction, biodiversity protection, renewable energy development, and the improvement of quality of life. These programs must be adapted to national conditions and needs, but at the same time they must take international frameworks into account so that activities do not lead to transboundary harm, just as Principle 2 of the Rio Declaration emphasizes the responsibility of states to prevent harm to the environment of other countries (Shaw, 2013).

Reporting to the Commission on Sustainable Development plays an important role in creating transparency and accountability. States are required to report regularly on their sustainable development measures and describe progress or existing obstacles. This process not only enables the evaluation of national performance but also facilitates the exchange of knowledge and experience among countries. Through these reports, the Commission on Sustainable Development can monitor the implementation of global sustainable development objectives and provide policy recommendations (United Nations General Assembly, 2013, 2021).

This obligation also faces challenges. First, coordination among national and regional bodies for implementing programs and collecting the required data requires sufficient organizational capacity and financial resources. Second, some countries may refrain from providing accurate information because of political or economic concerns, which can reduce transparency and

international cooperation. Third, scientific complexities and uncertainty in measuring environmental impacts may limit the quality of reports (Farshasaedi & Issazadeh, 2015; Pourkhaghan Shahrezaei, 2017). Despite these challenges, the obligation to prepare national environmental programs and report regularly is a vital foundation for realizing sustainable development and intergenerational justice. This mechanism not only obliges member states to act, but also provides a common language and a global assessment standard for comparing and improving performance in the field of the environment. As a result, the precise implementation of this obligation both helps protect natural resources and the environment for future generations and enables international cooperation and coordination in pursuit of sustainable development goals.

4.2.3. *The Responsibility of States in Technology Transfer and Support for Developing Countries*

One of the important principles of Agenda 21 and the 1992 Rio Conference is the emphasis on the role of developed countries in transferring clean and sustainable technologies to developing countries. This principle rests on the premise that many developing countries possess abundant natural resources but, because of financial, technical, and infrastructural limitations, are not able to use these resources sustainably or confront environmental challenges (Ramezani Qavam-Abadi & Shafiqfar, 2016). Within this framework, developed states and countries are required to make environmental technologies, renewable energies, water resource management technologies, and sustainable agriculture available to developing countries in an accessible and affordable manner. The objective of this technology transfer is to reduce environmental impacts and support economic development without degrading natural resources. This process also creates intergenerational and international justice, because developed countries with advanced technology can share the burden of protecting the global environment with developing countries (Dehm, 2020; Ramezani Qavam-Abadi & Shafiqfar, 2016).

However, the implementation of this responsibility is accompanied by challenges. First, developed countries may be reluctant to transfer advanced technologies because of economic competition or security concerns. Second, recipient countries sometimes lack the technical and managerial capacities needed to make effective use of these technologies. Third, disputes over intellectual property and patent rights can restrict access to essential technologies (Dehm, 2020; Pourkhaghan Shahrezaei, 2017).

Despite these challenges, the obligation to transfer technology and support developing countries is vital for achieving the goals of sustainable development. This approach enables all countries in the world to have a role in the process of environmental protection and the optimal use of natural resources and prevents the emergence of environmental inequalities between developed and developing countries. In other words, sustainable development cannot be achieved without technical and financial support and cooperation from advanced countries, and this principle is one of the key pillars of intergenerational and international justice in Agenda 21.

4.3. *The United Nations Framework Convention on Climate Change (1992) and the Kyoto Protocol (1997)*

The United Nations Framework Convention on Climate Change, adopted at the 1992 Rio Conference, is the first comprehensive international agreement to confront global climate change and emphasizes principles such as intergenerational justice and the distribution of responsibilities according to capacity and historical contribution to greenhouse gas emissions. One of the most important principles of this Convention is the principle of “common but differentiated responsibilities,” according to which all countries are responsible for reducing greenhouse gas emissions, but industrialized and developed countries, given their historical contribution and greater economic capacity, bear greater responsibility for reducing emissions and supporting developing countries. This principle is linked to intergenerational justice and emphasizes that the current generation must not consume natural resources and the environment in such a way as to deprive future generations of them. The implementation of these principles is operationalized through the formulation of national policies and measures to reduce emissions, the transfer of clean technologies, and financial support for developing countries, so that the economic development of the present generation is coordinated with the protection of natural resources for future generations (Intergovernmental Panel on Climate Change, 2013; Pourkhaghan Shahrezaei, 2017).

The Kyoto Protocol, adopted in 1997, constitutes the operational development of the UNFCCC and created specific obligations for countries to reduce greenhouse gas emissions. This Protocol established specified emission reduction targets

for industrialized countries and took into account the principles of intergenerational and historical justice. In addition, mechanisms such as emissions trading, joint implementation, and the Clean Development Mechanism were created so that industrialized countries could fulfill part of their obligations by investing in emission reduction projects in developing countries. These mechanisms not only reduce global emissions, but also promote technology transfer and support sustainable development in developing countries. By establishing obligations to reduce emissions, the Kyoto Protocol seeks to protect natural resources and the environment for future generations so that they too may benefit from healthy ecosystems and sustainable resources. The implementation of these two instruments creates obligations for both industrialized and developing countries. Industrialized countries are required to reduce greenhouse gas emissions according to established targets, provide financial resources and technology transfer to developing countries, and report regularly to assess progress. Developing countries are also required to formulate national mitigation and adaptation programs for climate change, cooperate with developed countries in technology transfer projects, and report on the state of the environment and the effects of their local measures. In the dimension of intergenerational justice, the current generation is committed to the sustainable use of resources and the prevention of environmental harms that threaten future generations. By setting specific obligations for industrialized countries, the Kyoto Protocol seeks to compensate for their historical share in creating the climate crisis and to distribute the burden of emission reduction equitably. Nevertheless, disputes between developed and developing countries over the extent of responsibility and the resources required, the difficulty of monitoring and proving emission reductions, and the provision of sustainable financial resources for developing countries are among the main challenges in implementing these instruments. Overall, the UNFCCC and the Kyoto Protocol provide an operational framework for realizing intergenerational and international justice and require countries both to comply with emission reductions and to support vulnerable countries, thereby ensuring a balance between the interests of the present and future generations and cooperation between developed and developing countries ([Intergovernmental Panel on Climate Change, 2013](#); [Pourkhaghan Shahrezaei, 2017](#)).

4.3.1. *The Obligation to Reduce Greenhouse Gas Emissions and National Planning*

Climate change means a “change in the average pattern of weather over a long period,” usually decades or longer. The main processes of climate change are well known, and since the late nineteenth century it has been understood that the increase of carbon dioxide (CO₂) in the atmosphere functions like an “additional insulator,” retaining more heat near the Earth’s surface. Greenhouse gas emissions, including CO₂, methane, nitrous oxide, and industrial gases such as chlorofluorocarbons, play a key role in climate change and global warming. Except for water vapor, the concentration of these gases is affected by human activities and has increased sharply since the Industrial Revolution, especially through fossil fuels, industrial processes, and deforestation resulting from agriculture. CO₂ is the most important greenhouse gas, and because of its long atmospheric lifetime, its impact is intergenerational; even if human beings were to stop greenhouse gas emissions completely, CO₂ concentrations would remain for decades and would only gradually decline in growth ([Intergovernmental Panel on Climate Change, 2013](#)).

Within international constraints, states have over the past two decades established an evolving international legal regime to address climate change and its consequences. The United Nations Framework Convention on Climate Change and the Kyoto Protocol are the first significant steps taken by the international community to address these concerns. These instruments were formulated with the aim of creating an international legal framework for common but differentiated responsibility in reducing greenhouse gas emissions and supporting national measures to confront climate change, especially with a focus on the needs of developing and vulnerable countries ([Esfandiari & Mirabbasi, 2015](#); [Intergovernmental Panel on Climate Change, 2013](#)).

The Convention divides its member states into two groups: Annex I states, which are mostly industrialized and developed countries with high historical responsibility for greenhouse gas emissions, and non-Annex I states, which include developing and least developed countries and receive special assistance. The Kyoto Protocol, adopted in 1997 and legally binding from 2005, specified legally binding obligations for reducing greenhouse gas emissions in Annex I countries for the first commitment period from 2008 to 2012 and provided implementation mechanisms such as joint implementation, the international emissions

trading system, and the Clean Development Mechanism to facilitate the realization of these obligations ([Intergovernmental Panel on Climate Change, 2013](#); [Pourkhaghan Shahrezaei, 2017](#)).

The United Nations Framework Convention emphasizes the stabilization of greenhouse gas emissions on the basis of 1990 emission levels without specifying detailed implementation methods; these details were included in the Kyoto Protocol, which is a binding instrument. However, neither of the above instruments provides a clear enforcement guarantee for its obligations. Therefore, the starting point of discussion concerning the international responsibility of states for climate change is the creation of a link between the legal framework of the conventions and the principles of international responsibility in general international law ([Pourkhaghan Shahrezaei, 2017](#)).

From a human rights perspective, climate change has a direct effect on food and water security. The International Covenant on Economic, Social and Cultural Rights recognizes the right of access to adequate food as an essential element of the right to an adequate standard of living, and the Committee on Economic, Social and Cultural Rights emphasizes that this right is essential for human dignity and requires the adoption of appropriate economic, environmental, and social policies ([Esfandiari & Mirabbasi, 2015](#)). Threats arising from climate change can severely affect the access of individuals and vulnerable groups to food. The United Nations Framework Convention also emphasizes the importance of ensuring access to food, which requires the stabilization of greenhouse gas emissions within a specified timeframe to prevent threats to food production ([Intergovernmental Panel on Climate Change, 2013](#)).

Moreover, the right of access to water, as an essential condition of survival, is inseparably linked with other human rights, such as the right to adequate standards of living, the right to health, and the right of access to sufficient food. Climate change can reduce water resources and cause water scarcity; as studies show, even a one-degree Celsius increase in temperature threatens water supply for millions of people, while a five-degree Celsius increase can have severe effects on glaciers and water sources in Asia ([Intergovernmental Panel on Climate Change, 2013](#)). On this basis, it is necessary to provide compensatory mechanisms for future environmental losses. These mechanisms include the creation of financial compensation funds for vulnerable countries, support for sustainable development programs and the transfer of clean technologies, and the development of coordinated global policies for reducing greenhouse gas emissions. Such international measures are supported not only legally by conventions and the Kyoto Protocol, but also ethically and humanely, so that intergenerational justice and the right of access to vital resources for future generations are guaranteed.

4.3.2. The Obligation of International Cooperation and Support for Vulnerable Countries

The obligation of international cooperation and support for vulnerable countries in the field of climate change is one of the foundational principles of international environmental law and global policy. Climate change is a global phenomenon that no country can control alone, because greenhouse gases emitted in one country can rapidly affect the climate of the entire world. This reality has led countries, on the basis of the United Nations Framework Convention on Climate Change and the Kyoto Protocol, to be required to cooperate and coordinate at the international level. Within these frameworks, industrialized and developed countries, as the main historical sources of greenhouse gas emissions, have a responsibility to provide technical, financial, and technological support to developing and vulnerable countries so that they too can implement mitigation and adaptation programs for climate change. Support for vulnerable countries includes the provision of financial resources to confront losses and disasters caused by climate change, the transfer of clean and sustainable technologies, training and capacity-building, and the creation of effective mechanisms for managing environmental risks. This cooperation is particularly vital for regions that experience the highest climate risks, including small islands, river deltas, and arid and semi-arid areas, because these countries have limited domestic capacity and insufficient financial resources to confront climate crises. International cooperation also enables developing countries to move along the path of sustainable development without greenhouse gas reduction obligations preventing their economic growth ([Intergovernmental Panel on Climate Change, 2013](#); [United Nations General Assembly, 2022](#)).

From a scientific and legal perspective, the international obligation to support vulnerable countries is based on the principle of “common but differentiated responsibilities,” which is recognized in the UNFCCC and the Kyoto Protocol. This principle emphasizes that developed countries, which have the largest historical share in greenhouse gas emissions, must bear a greater

burden in reducing emissions and supporting other countries. In addition, such cooperation strengthens trust among countries and increases the effectiveness of international agreements, because states see that their actions are accompanied by global support rather than being a unilateral obligation (Intergovernmental Panel on Climate Change, 2013; Pourkhaghan Shahrezaei, 2017).

Analytically, the obligation of international cooperation and support for vulnerable countries is not only an ethical and humanitarian obligation, but also essential to the overall success of climate change policies. Without this cooperation, developing countries may be unable to reduce greenhouse gas emissions because of a lack of resources and technology or may be unable to adapt effectively to the consequences of climate change, which will ultimately lead to increased intergenerational injustice and intensified global harm. Therefore, environmental justice and the reduction of global risks cannot be realized without cooperation and mutual support among countries.

4.3.3. *The Provision of Compensatory Mechanisms for Future Environmental Losses*

With the increasing effects of climate change and the occurrence of transboundary environmental losses, the necessity of creating compensatory and international accountability mechanisms for states is felt more strongly than ever. The United Nations Framework Convention on Climate Change (1992) and the Kyoto Protocol (1997) were the first international legal steps toward responding to these challenges, and by defining the common but differentiated responsibility of states in reducing greenhouse gas emissions and supporting vulnerable countries, they provided a framework for managing the consequences of climate change. However, despite existing obligations, these instruments did not provide a specific and binding mechanism for compensation for future environmental losses. For this reason, analyzing future compensatory mechanisms from the perspective of international environmental law and the international responsibility of states is of vital importance. This issue includes examining the role of preventive obligations, proving the causal relationship between greenhouse gas emissions and incurred losses, determining standards of responsibility, and designing financial and compensation mechanisms to support vulnerable countries (Farshasaieidi & Issazadeh, 2015; Pourkhaghan Shahrezaei, 2017).

Indeed, apart from responsibility arising from prohibited acts in the field of environmental law, in order to establish the international responsibility of a state, that state must have committed a wrongful act, which may include either an act or an omission. In other words, the secondary rules of international responsibility apply only when the act of a state constitutes a breach of a primary international obligation. Even if the relevant act can be attributed to the state from which the harm originates, responsibility requires the breach of an international obligation. In cases of transboundary pollution, responsibility attaches only to the state that has violated the principle of “non-harmful use of territory.” According to this principle, states are required to prevent acts that cause harm and damage to persons or property within the territory of other states. Article 194(2) of the United Nations Convention on the Law of the Sea, as a binding treaty, expresses this obligation by requiring states to take all necessary measures to ensure that activities under their jurisdiction or control are conducted in such a manner that they do not cause damage to other states or their environment and that pollution arising from activities does not spread (Farshasaieidi & Issazadeh, 2015; Shaw, 2013).

The 1992 United Nations Framework Convention on Climate Change and the 1997 Kyoto Protocol also specify treaty-based legal standards regarding losses arising from climate change. Naturally, to prove the breach of an international obligation, the treaty must have been binding upon the relevant country at the time of the breach. On this basis, countries with the highest greenhouse gas emissions that have not ratified the Kyoto Protocol, or countries that have no legal obligation to reduce emissions, cannot be held responsible for non-compliance with the Protocol’s targets (Pourkhaghan Shahrezaei, 2017).

One of the important questions in this field is determining the threshold of harm for responsibility. Legal instruments on transboundary air pollution provide that pollution must have harmful effects, in the sense that it affects human health, living resources, ecosystems, and material property or interferes with legitimate uses of the environment. In addition, international environmental rules provide that states are required to prevent, reduce, and control transboundary pollution so that no significant harm is caused to the territory of other states. These provisions reveal definitional challenges, because none of the relevant instruments precisely specifies the threshold of harm required to establish responsibility. Nevertheless, the importance of the circumstances and characteristics of each case is considered a determining factor in specifying the extent of harm. The

connection of responsibility with the concept of “reasonable and equitable use of territory” has also not yet received complete support at the international level (Farshasaeidi & Issazadeh, 2015; Shaw, 2013).

The causal connection between the harmful act and the loss incurred is another element of traditional international responsibility. Causation is difficult in cases of widespread pollution where multiple sources cause harm and no single origin is identifiable. It has been suggested that causation can be established on the basis of the contribution of a particular factor to climate change, regardless of the amount of harm caused by that factor, because this issue plays a role at the stage of determining and allocating costs. Moreover, any greenhouse gas emission can increase the risk of harm. However, in the absence of an international approach to specifying causation, the way in which courts or international tribunals will deal with complex and multiple causes remains unclear (Pourkhaghan Shahrezaei, 2017).

The appropriate standard for determining the agent of harm is also one of the challenges of international environmental law. At times, the theory of “strict liability” is used as the preferred standard regarding state conduct. This theory increases state responsibility, but its acceptance in international law is unclear. Judicial practice has not consistently accepted it. The more common standard is the “due diligence obligation,” which has been accepted in most treaties and means that states are recognized as responsible only if they breach specific obligations in legal instruments. For example, Article 194 of the 1982 Convention on the Law of the Sea provides that states are obliged to take all necessary measures to prevent, reduce, and control marine pollution and must employ all practical means compatible with their capacities. On this basis, states are not automatically considered responsible for damage without considering all factors involved in each situation; rather, they bear legal responsibility only if they fail to comply with their obligations. This conduct may also include establishing consultation and notification systems so that effective prevention is achieved (Shaw, 2013).

After the harmful act and causal relationship have been established, two theories are raised concerning the realization of responsibility: first, a state that fails to exercise due diligence or violates international rules is responsible; second, responsibility arises if significant environmental damage occurs. States are required to observe reasonable and ordinary standards to prevent transboundary harm. For example, failure to adopt environmental regulations can lead to the attribution of activity and the breach of international obligations (Vafadar, 2007).

4.4. *The 2015 Paris Agreement*

The 2015 Paris Agreement, adopted at the United Nations Climate Change Conference (COP21) and entering into force on 4 November 2016, is a turning point in international environmental law and global climate policy. The significance of this agreement from the perspective of intergenerational justice is considerable, because its objectives and obligations are directly related to the protection of future generations and the reduction of the destructive effects of climate change. The long-term objective of Article 2 of the Paris Agreement provides that the increase in the global average temperature should be held “well below 2 degrees Celsius above pre-industrial levels” and that efforts should be pursued to limit the temperature increase to 1.5 degrees Celsius. This scientific and environmental objective carries an intergenerational justice burden, because the consequences of climate change will have the most negative effects on future generations and vulnerable communities, who have contributed very little to greenhouse gas emissions (Intergovernmental Panel on Climate Change, 2013; United Nations General Assembly, 2021).

One of the most important mechanisms for realizing intergenerational justice in the Paris Agreement is the nationally determined contributions (NDCs). Under Article 4, each state party is required to formulate and report its plans for reducing greenhouse gas emissions, and these commitments must be reviewed and strengthened every five years. This five-year cycle, as a legal and political mechanism, ensures that states are required to continuously improve their actions and that long-term measures for protecting future generations are consolidated, so that later generations can enjoy a healthy environment and sufficient natural resources (United Nations General Assembly, 2021, 2022).

The Paris Agreement pays special attention to adaptation and resilience in the face of climate change. Article 7 of the Agreement emphasizes increasing adaptive capacity, strengthening resilience, and reducing the vulnerability of communities and ecosystems, and states that adaptation measures must be designed in such a way as to ensure the highest level of protection for future generations and vulnerable populations. From the perspective of intergenerational justice, this obligation shows that

the rights of future generations have been considered in the formulation of national and international policies, especially in countries where the effects of climate change on food security and water resources will be more severe ([Intergovernmental Panel on Climate Change, 2013](#)). Financial support and technology transfer are also important elements of intergenerational justice. Article 9 of the Paris Agreement requires developed countries to provide financial resources, technology, and capacity-building necessary for developing countries so that they too can confront the consequences of climate change and continue sustainable development. These obligations are designed to prevent future generations in highly vulnerable countries from facing compounded deprivation and to make the capacities necessary for adaptation and mitigation available ([United Nations General Assembly, 2021, 2022](#)).

The Paris Agreement also creates a mechanism for reviewing states' progress by emphasizing transparency and periodic reporting. Under Article 13, all countries are required to provide transparent and comparable information on greenhouse gas emissions and progress in implementing NDCs, and this information is assessed through a global transparency system. This mechanism assures future generations that today's state commitments are traceable and assessable and that timely review and correction of measures is possible. The important analytical point is that although the Paris Agreement does not explicitly use the term "intergenerational justice," its long-term temperature goals, the NDC review cycle, the transparency mechanism, and financial and technological support are all components that clearly address the protection of future generations and the reduction of climate change risks for them ([Intergovernmental Panel on Climate Change, 2013](#); [United Nations General Assembly, 2021, 2022](#)). These elements show that the Paris Agreement is not only a technical framework for reducing greenhouse gas emissions, but also a legal and political instrument for realizing intergenerational justice, because future generations are taken into account in terms of their right to enjoy a healthy environment and sustainable natural resources.

5. Conclusion

The present study was conducted with the aim of examining the effect of the requirements of international environmental law on the principle of intergenerational justice in the period from 1972 to 2024. It showed that the concept of intergenerational justice has gradually transformed from an ethical and philosophical idea into an invocable principle in international environmental law. The examination of international instruments, environmental treaties, and the practice of international institutions indicates that the protection of the interests of future generations has become one of the main concerns of the international community and that states are compelled to pay attention to the long-term effects of their environmental decisions. The findings of the study show that although various international instruments have emphasized the need to protect the environment for future generations, there remains a significant gap between declaratory obligations and their practical implementation. Moreover, the principle of intergenerational justice faces challenges such as the absence of effective enforcement guarantees, conflict with the economic interests of states, and the weakness of monitoring mechanisms. Nevertheless, the gradual development of international environmental law, the formation of common obligations, and the increasing role of international institutions indicate that the international legal system is moving toward recognizing the responsibility of states toward future generations. Ultimately, it can be concluded that the real realization of intergenerational justice requires the strengthening of international cooperation, the creation of more effective implementation mechanisms, and the transformation of ethical obligations into binding legal requirements, so that more effective protection of the rights of future generations and the global environment can be achieved.

A systematic analysis of the data obtained from the examination of international instruments, multilateral environmental treaties, institutional practices of international organizations, and developments in international environmental law from 1972 to 2024 shows that the requirements of international environmental law have played a decisive role in the gradual strengthening, development, and institutionalization of the principle of intergenerational justice. The findings of this research indicate that this impact has not occurred suddenly or at once, but rather gradually and in stages, and can be identified in three normative, treaty-based, and institutional domains. In the first domain, namely the normative dimension, the examination of the data shows that international environmental law has provided the conceptual and theoretical ground necessary for accepting the idea of intergenerational justice through the development of foundational 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 responsibility. Although these principles do not appear to refer directly to future generations, they are in substance based on long-term temporal logic and attention to the transboundary and future-oriented effects of states' decisions. Therefore, content analysis of these principles shows that intergenerational justice has gradually entered the international legal system indirectly and through the expansion of these normative principles.

In the second domain, namely the treaty-based dimension, the examination of international treaties and instruments shows that since the 1972 Stockholm Conference, an increasing trend has emerged toward the explicit or implicit recognition of the interests of future generations in binding and non-binding instruments. This process reached an important turning point at the 1992 Rio Conference and especially in the principle of sustainable development, in such a way that the concept of sustainable development, as a legal-policy framework, directly emphasized the necessity of meeting the needs of the present generation without endangering the ability of future generations. In the field of climate change as well, treaties such as the 1992 Framework Convention on Climate Change and the 2015 Paris Agreement, by creating behavioral and structural obligations for states, have indirectly introduced the logic of intergenerational justice into their legal structure. In the field of biodiversity and ecosystem protection, instruments such as the Convention on Biological Diversity also show that the protection of natural resources as the common heritage of humankind has a nature beyond the short-term interests of states and is directed toward long-term and intergenerational interests.

In the third domain, namely the institutional and executive dimension, the findings of the study show that the formation and development of monitoring and control mechanisms in international environmental law have played an important role in the practical strengthening of the principle of intergenerational justice. The creation of periodic reporting systems, mechanisms for monitoring and assessing states' obligations, committees and supervisory bodies within environmental treaties, and the development of collective review procedures for state performance all indicate the movement of the international legal system toward increasing transparency, accountability, and controllability of state conduct in the environmental field. Although these mechanisms have not been designed directly under the title of intergenerational justice, in practice they have caused states to be compelled to take into account the long-term effects of their actions on future generations in their decision-making.

Furthermore, international environmental law, through a range of normative, institutional, procedural, interpretive, and financial instruments, has provided a basis for recognizing and supporting the rights and interests of future generations. Although this legal system has not yet fully and explicitly recognized the "rights of future generations" in the form of hard and binding rules, it has gradually introduced intergenerational logic into the legal structure of the environment through the development of principles, practices, and international mechanisms, and has transformed the future into one of the essential elements of environmental decision-making. First, normative instruments are the most important basis for recognizing the interests of future generations. In addition, concepts such as the "common heritage of humankind" and "sustainable use" are based on the idea that certain natural resources belong to all humanity, including both the present generation and future generations, and that their use must be such that their continuity and usability for the future are preserved. Second, institutional instruments play an important role in the indirect representation of future generations. Since future generations are unable to be present in international decision-making processes, international environmental institutions effectively assume the task of protecting their interests. Institutions such as the United Nations Environment Programme, the United Nations Development Programme, the World Meteorological Organization, the Intergovernmental Panel on Climate Change, the Convention on Biological Diversity, the Climate Change Convention, and other specialized institutions introduce the interests of future generations into global policymaking through the production of scientific knowledge, reporting, monitoring the state of the environment, and warning about future risks. In particular, the IPCC, by providing scientific reports on climate change, has formed the basis of many climate decisions and state obligations and has played an important role in institutionalizing a future-oriented perspective. In addition, ideas such as creating a "Commissioner for Future Generations" or a "Special Office for Posterity" also indicate the tendency of the international community to create institutions for more direct protection of the rights of future generations. Finally, the most important examples of intergenerational obligations in international environmental law can be seen in the areas of climate change, biodiversity protection, marine environmental protection, and the protection of natural and cultural heritage. The obligation to reduce greenhouse gas emissions, protect the climate system, use biological resources sustainably, protect the deep seabed as the common heritage of humankind, and protect the world's natural and cultural heritage have all been formed with the aim of preserving the vital capacities of the environment for future generations. These limitations also reflect the same structural tension between short-term interests and long-term intergenerational

requirements. The relationship between intergenerational obligations and other obligations of international law cannot be explained through a rigid and predetermined hierarchy. In practice, this relationship depends on judicial interpretation, governmental policymaking, international discourse, and even contemporary scientific knowledge. Intergenerational obligations are naturally future-oriented, whereas many traditional rules of international law have been designed with a present or near-term temporal horizon. This temporal conflict often causes the full implementation of intergenerational obligations to encounter structural resistance.

6. Recommendations:

The adoption of a comprehensive convention on intergenerational justice: The international community should adopt an independent treaty defining the rights of future generations and the obligations of states. This instrument should be accompanied by monitoring, reporting, and effective enforcement mechanisms.

The international criminalization of ecocide, or environmental criminal responsibility: Extensive and irreversible destruction of the environment should be recognized as an international crime in the Statute of the International Criminal Court. This would enable the prosecution of officials and corporate managers.

The strengthening of the evidentiary standard in ecocide cases: To increase the possibility of proof, “severe, widespread, and long-term harm to vital ecosystems” should be defined as the main standard. In addition, the use of climate scientific data and international reports as valid evidence should be made mandatory.

The establishment of an international environmental court or specialized chamber: A specialized judicial body should be created to adjudicate environmental crimes and intergenerational claims. This institution can play an important role in increasing the effectiveness of the implementation of environmental law.

The strengthening of preventive and precautionary obligations: States must be required to act before irreversible harm occurs. The precautionary principle should be transformed into a binding and judicially invocable rule.

The institutionalization of representation for future generations: It is necessary to create the office of “trustee of future generations” at national and international levels. This institution can intervene in decision-making processes and environmental complaints.

The development of the human rights dimension of intergenerational justice: The right to a healthy environment should be developed as part of the right to life and health. This connection strengthens the possibility of making intergenerational obligations binding.

The strengthening of long-term and result-oriented treaty obligations: Treaties should establish specific quantitative and temporal targets for reducing environmental harm. These obligations should be assessable and judicially enforceable.

The reform of the responsibility regime for multinational corporations: Corporations should bear direct responsibility for intergenerational harms, even without direct intent. The criterion of “awareness of long-term risk” should be sufficient to establish responsibility.

The strengthening of ecological education and literacy in society: Environmental education should be made compulsory at all levels of education and linked to the rights of future generations. This will institutionalize a culture of intergenerational responsibility in society.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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