

# CLIMATE CHANGE ON THE INTERNATIONAL PLANE: RISK MANAGEMENT AND THE NATURE OF THE PRECAUTIONARY PRINCIPLE<sup>1</sup>

**Jamile Bergamaschine Mata Diz<sup>2</sup>**

Escola Superior Dom Helder Câmara (ESDHC) |

**Elizabeth Accioly<sup>3</sup>**

Universidade Europeia de Lisboa |

## ABSTRACT

This article aims to analyze the treatment of climate change in the international scenario and is premised on the precautionary principle and risk management, unique elements for understanding the effects generated by this phenomenon. Therefore, the work verifies to what extent the international regime established by the Kyoto Protocol and, later, by the Paris Agreement can be correlated with the legal nature of the precautionary principle. The methodology adopted for the research will focus on the main aspects established for an interdisciplinary research of deductive reasoning, with a method of technical procedure in international reports, books and magazines. It was verified, by way of conclusion, that consideration of the precautionary principle based on the recognition of its general nature, applicable *erga omnes* and with binding effect, would facilitate the very recognition of climate change as a catalyst for actions derived from anthropogenic action.

**Keywords:** climate change; International Law; precautionary principle; risk.

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<sup>2</sup> PhD in Public Law/Community Law from Universidad Alcalá de Henares (UAH). Master in Public Law from the UAH. Master in EU Institutions and Policies from the Universidad Camilo José Cela (UCJC). Coordinator of the Jean Monnet Chair of Law at the Federal University of Minas Gerais (UFMG), Director of the Centro de Excelência Europeu Jean Monnet. Professor at the Faculty of Law of UFMG. Professor at the PPGD at Escola Superior Dom Helder Câmara (ESDHC). Coordinator of the Research Network “Integração, Estado e Governança”. Lattes curriculum: <http://lattes.cnpq.br/6713925333676182> / ORCID: <https://orcid.org/0000-0001-8709-0616> / e-mail: [jmatadiz@yahoo.com.br](mailto:jmatadiz@yahoo.com.br)

<sup>3</sup> PhD in International Law from the Universidade de São Paulo (USP). Professor at the Universidade Europeia de Lisboa. Attorney. Lattes curriculum: <http://lattes.cnpq.br/1567080170454602> / ORCID: <https://orcid.org/0000-0002-1877-5109> / e-mail: [eaccioly@uol.com.br](mailto:eaccioly@uol.com.br)

## **MUDANÇAS CLIMÁTICAS NO PLANO INTERNACIONAL: GESTÃO DE RISCO E A NATUREZA DO PRINCÍPIO DA PRECAUÇÃO**

### **RESUMO**

*Este art. tem por finalidade analisar o tratamento da mudança climática no cenário internacional e tem como premissa o princípio da precaução e a gestão do risco, elementos singulares para a compreensão dos efeitos gerados por tal fenômeno. Logo, o trabalho verifica em que medida se pode correlacionar o regime internacional instituído pelo Protocolo de Kyoto e, posteriormente, pelo Acordo de Paris com a natureza jurídica do princípio da precaução. A metodologia adotada para a pesquisa centrar-se-á nos aspectos principais estabelecidos para uma pesquisa interdisciplinar de raciocínio dedutivo, com método de procedimento técnico em relatórios internacionais, livros e revistas. Verificou-se, a título de conclusão, que consideração do princípio da precaução a partir do reconhecimento de sua natureza geral, aplicável erga omnes e com efeito vinculante, facilitaria o próprio reconhecimento das mudanças climáticas como elemento catalizador de ações derivadas de uma atuação antropogênica.*

**Palavras-chave:** *Direito Internacional; mudanças climáticas; princípio da precaução; risco.*

## INTRODUCTION

The national protective measures for the environment linked to sustainable development unfold at the international level, with the State participating in international conferences, as well as being a signatory to important conventions and other international acts, even if of a merely directive nature, as in the case of the Declaration resulting from the United Nations Conference on Environment and Development (UNCED) and other acts that raised the degree of sustainable development to the current level of Human Rights, recognized by UN Resolution no. 76/300, approved by the General Assembly in August 2022.

Specifically with regard to climate change – considered a planetary frontier – efforts have been concentrated in the sense of adopting an international system and/or regime, of a mandatory nature, whose parameters must reach the highest degree of protection given the already recognized consequences of its adverse effects on the planet and its inhabitants, and also those still unfinished, which will be studied based on the precautionary principle parameter.

The precautionary principle, as will be seen further on, has been the subject of questioning in relation to its legal nature as a general principle of law. This fact occurs because, contrary to the principle of prevention, where knowledge of the damage that a given undertaking may cause is already there, the principle of precaution is not based on previously established certainty. Therefore, the precautionary principle is used to avoid the risk, even if there is no full knowledge of the damage.

Thus, the present work aimed to analyze the treatment of climate change in the international scenario, based on the precautionary principle and risk management, unique elements for understanding the effects generated by this phenomenon.

The focus adopted in the article verifies to what extent the international regime established by the Kyoto Protocol and, later, by the Paris Agreement can be correlated with the legal nature of the precautionary principle and its generality, whose spectrum permeates risk management. To this end, the following assumptions justifying this research will be adopted: (i) the creation of an international system and/or regime that brings together, to a greater or lesser extent, a consensual decision-making process; (ii) the contextualization, albeit succinct, of the regulatory framework that gave rise to international legislation on climate matters; and (iii) the centrality

of the precautionary principle as a structuring element of the risk-anticipation-caution triad applied to the subject under analysis.

The work methodology should focus, therefore, on the main aspects established for an interdisciplinary research that involves themes of Environmental Law and its treatment by International Law, in particular the normative treatment dedicated to climate change.

This occurs mainly because of the specific and unique character that must be present in every analysis of legal systems, whose focus is based on providing greater protection to the environment. In addition to being considered the main axis in the theme of climate change and its international regulation

In this sense, methods will be used that allow analyzing what are, and how they were developed, the international instruments – in particular the Kyoto Protocol and the Paris Agreement – and their respective correlation with risk management, whose axis is linked to the consideration of precaution as a general principle of international law and the consequences of such consideration.

The deductive method allowed establishing the conceptual and practical premises applied to the theme, also considered from the perspective of the construction process of an international climate change regime, consistent with the so-called risk society, according to an investigation centered on the international system and its respective regulation.

## **1 CLIMATE CHANGE IN THE INTERNATIONAL SCENARIO**

In order to schematically determine which were the main actions and instruments that contributed to recognizing the internationalization of the environment and the consequent discussions and measures related to it, a chronological analysis of the development of climate legislation will be made, even though it is not a detailed analysis of all international instruments aimed at environmental protection, given the growing negotiation, signing and incorporation of broad sense international acts, that is, treaties, conventions, protocols, resolutions, etc. that govern questions about the environment.

Despite the doctrinal divergence, the creation of international instruments signed from the 1960s onwards can be considered the establishment of a new legal-institutional aspect, in which the man-property-community relationship came to be mediated by factors exogenous to this system,

capable of leveling the effects of the action of the different forces in conflict (individual interest and collective interest) (MATA DIZ; SOARES ALMEIDA, 2014).

The Stockholm Convention, by expressing legal principles of a markedly international nature, led to the establishment of a new interstate order based on an aspect hitherto ignored, to a greater or lesser extent, by the States: this order is based on the fact that the environment constitutes a “world heritage” whose conservation and consequent protection affects all of humanity, and as such, should be the object of everyone’s attention. The environmental issue is, therefore, disconnected from the particular sphere of each State, adopting a common premise that must be universally observed: that the international protection of the environment encompasses each of the international actors – understood in a broad sense – individually and collectively.

In addition to representing a first universal attempt to develop specific principles and objectives for environmental protection, the Stockholm Convention also dealt with the issue of transboundary pollution, a concept of special relevance, as it led to the consecration of a postulate for environmental responsibility, understood, in a broad sense, as that which can extend beyond the physical-territorial borders of a given country (MATA DIZ; SOARES ALMEIDA, 2014).

Subsequently, in the Declaration of Rio de Janeiro (ECO/92) – adopted within the framework of the United Nations Conference on Environment and Development (UNCED) – also considered an important milestone for the strengthening of environmental law, some of the principles adopted in Stockholm were consolidated, and it adds other elements and principles necessary for the creation of a solid legal body focused on environmental protection.

Furthermore, at the United Nations Conference on Environment and Development (UNCED-92), the 172 participating nations approved three agreements:

- a) Agenda 21 to promote sustainable development, considered a global plan of action that binds the countries that participated in UNCED. The areas and programs of Agenda 21 were systematized in 4 parts and 40 chapters, described in terms of bases of action, objectives, activities and means of implementation, and can be synthesized from different aspects (SILVA, 2009).
- b) Declaration of Principles Related to Forests: is a legally non-binding

declaration of principles, which seeks a global consensus on the management, conservation and exploitation of all types of forests.

- c) Rio Declaration on Environment and Development, known as the Earth Charter: containing 27 principles, in this document the signatory states undertake to introduce certain instruments of environmental policy into national environmental legislation (Principle 11), in order to achieve the preservation of development sustainability and human protection.

In this regard, two legally binding instruments were opened for signature: the Convention on Biological Diversity, which pursues the multiple purpose of conserving biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits derived from the use of resources, and the Framework Convention on Climate Change.

It is emphasized that discussions on climate change have been taking place before UNCED-92. The Intergovernmental Panel on Climate Change (IPCC) created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) deserves special mention.

From a theoretical perspective, it is important to point out that the issue of climate change went through a period of uncertainty and disbelief and was later considered a priority for the achievement of high-level environmental protection goals. Also, the consideration of the so-called planetary borders, in the expression of Rockstrom *et al.* (2009), placed the climate issue as an element of environmental emergency that can be considered a common global good, whose responsibility overflows and involves all actors – public and private, national and international.

### **1.1 Contextualization of a global problem and the respective adoption of an international regulation**

The Kyoto Protocol is characterized as an international act that directly influenced the regulation on greenhouse gases reduction, although its implementation has not been exempt from extensive debates due to the need to establish norms whose compliance would be mandatory, on the basis of a distribution system based on States' historical averages, thus implementing the principle of common but differentiated responsibility. After several rounds of negotiations, the agreement was signed on December 11, 1997, consolidating the commitments assumed after the Framework Agreement that was signed in 1992.

The relevance of the Kyoto Protocol can be measured from three basic aspects:

- a) To establish measures for an effective greenhouse gases reduction, considering the potential and averages of each State. In this sense, during the negotiations, different indicators were analyzed in order to reach a consensus among the States. As expressed by Souza; Corazza (2017, p. 62) XX “accumulated emissions are considered a proxy of each country’s responsibility in relation to climate change, since they describe the total historical emissions of each one of them”. The authors also emphasize that such historical emissions were gradually systematized from the Industrial Revolution, but especially from the second post-war period, making climate change to be considered an “intertemporal environmental problem” (SOUZA; CORAZZA, 2017, p. 63).
- b) To recognize the asymmetries between states, especially those considered to be developing, based on the consideration of the contribution of each of the state entities to increase or mitigate greenhouse gases emission, as analyzed by the specialists, making the climate change theme a global one, and the state individualities, however, cannot be equally computed.

According to Rubial (2016, p. 80) when analyzing the principle of common but differentiated responsibility, he points out that this can be considered

[...] a way of interpreting the path to fulfill the purpose in which developed countries should take the lead in terms of both reducing emissions and providing means for developing countries to generate their own climate actions.

- c) To adopt an international normative framework that was, to a greater or lesser extent, assumed by States in their domestic legislation, established from the recognition that climate change deserves the creation of a normative *corpus* able to face challenges that do not know delimited borders or individualized responsibilities as it is a global problem, as stated elsewhere.

The commitments assumed by Kyoto did not reach the degree of effectiveness that had been established by the negotiators, since the States in the scope of the COPs did not manage to advance towards a more positive and binding agenda, in which the climate change issue could be considered a priority part of the national and international environmental agendas.

One of the main reasons for stating that Kyoto was not very successful was the increase in greenhouse gases in the period stipulated by Kyoto

(2008-2012), which indicates the urgent need to establish perhaps stricter control mechanisms, as well as the global recognition that the reduction of such gases requires progressive, joint and necessary action by States and other actors (COSTA; MATA DIZ, 2020).

Another issue pointed out by the doctrine was the accountability system created by the Protocol, based on the control system established by it, and the respective norms to be applied in case of non-compliance, since the “Kyoto Protocol originated the most successful procedure for non-compliance to date. It is inspired by procedures already tested in other environmental problems, while at the same time overcoming them even more: it is, in fact, more innovative and more elaborate” (DUBOIS; MOROSINI 2016, p. 207-208).

From this perspective, the importance of the Conference of the Parties (COP) is also cited, established as the highest body of the institutional structure of the Framework Convention and the Kyoto Protocol (art. 13), in which its functions are detailed in relation to the fulfillment of said Protocol. Therefore, it is worth mentioning how the evolution of the COPs enabled the signing of a new agreement whose main function was to review, reinforce and implement new measures to combat the problems brought about by greenhouse gas emission.

In a temporal conception, it is noted that after 2009 – when dissensions and debates on the subject resumed – the need to provide for new measures so that the fight against the effects generated by climate change assumes its condition of global common, reinforcing that environmental protection must be adopted on a multilevel scale in which international agreements are used as a *sine qua non* condition for mitigating the problems caused. The adoption of an international regime that regulates the action of all actors becomes essential to guarantee the adequate, necessary and global protection that the climate emergency demands. It is therefore urgent to remember the Paris Agreement and to carry it out until 2022.

## **1.2 From the Paris Agreement to the 2022 Conference of the Parties**

Given the problems pointed out by the doctrine for non-compliance with the Kyoto Protocol (DUBOIS; MOROSINI, 2016), it became necessary to establish new measures that would effectively achieve greenhouse gas effects reduction and, consequently, to adopt new commitments and goals for all actors, notably States.



Since Copenhagen, in 2009, where a maximum limit of 2% for the increase in global temperature was adopted in relation to the historical average<sup>4</sup>, passing through other Conferences of the Parties, different proposals and revisions were gradually made for the consolidation of the climate regime. However, it was in 2015, with the proposal of a new Agreement that could correct and/or improve what had already been initiated in Kyoto, that a consensus was sought to adopt measures whose objective was “Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;; [...]”, as expressed literally in art. 2 of the Paris Agreement.

It is worth noting that the Agreement is based on three major axes: mitigation – measures to limit climate change based on mechanisms and technologies that reduce greenhouse gases; adaptation – conditions that promote adaptation to such mitigating measures and, finally, cooperation and support so that these measures can be globally and indistinctly applied, by reducing and maintaining the climate at the levels determined in art. 2, cited elsewhere<sup>5</sup>.

Likewise, it should be noted that the Agreement provided for the financing of initiatives and/or measures to be adopted, that is, developed countries would have to invest 100 billion dollars per year in combating climate change. It should be noted that the agreement provided, in its art. 10, the transfer of technology in the fight against poverty and the inseparability between human rights and environmental rights.

Likewise, given that the capacity for action is disproportionate across countries, greater responsibility for global levels of pollution falls to some specific members, since the agreement provides greater responsibility for the more industrialized members (COSTA; MATA DIZ, 2020).

However, the biggest criticism of the agreement refers not only to the

4 The impact of the failure of Copenhagen can be gauged from the observation that the States did not adopt the necessary measures to reach the goals and were not willing to assume new commitments with “stricter” limits than those inserted in the Protocol. In addition, studies carried out by the Intergovernmental Group concluded that the increase in CO<sub>2</sub> emissions was a reality. However, negotiations for the revision of the Protocol were opened, in addition to the States’ firm commitment to permanent national policies for GHGs reduction, especially the developing States (COSTA; MATA DIZ, 2020).

5 More precisely, as determined by Miranda (2018, p. 101) “In effect, the decision adopting the Paris Agreement warns that the estimated aggregate levels of greenhouse gas emissions in 2025 and 2030 resulting from the INDCs do not fit the scenarios below 2 degrees Celsius, but lead to a projected level of 55 gigatons in 2030, when 40 gigatons would be needed for that year”.

non-binding commitments, but also to the absence of inspection mechanisms, since countries' actions are taken based on more "soft" aspects (voluntary and soft law) and less coercive, depending to a large extent, therefore, on domestic initiatives.

Along this path, in 2017, in Bonn, the second conference was held after the signing of the Paris Agreement, in 2015, whose focus had as a crucial point the development of the agreement and its consequent operationalization for entry into force in 2020, as foreseen.

The technical discussions, at that time, and the guidelines known as the "Paris Book of Rules" culminated in the generation of a ripple effect caused by deficiencies in its design and wording. In addition, the tension between the so-called developed and developing members was palpable, exacerbated with the withdrawal of the United States from the agreement in early 2017.

Under these circumstances, the main initiatives were: (i) the "Fiji push" and the "Talanoa Dialogue", to assist countries in implementing their nationally determined contributions; (ii) ratification of the Doha Amendment; (iii) the possibility of technological mobilization to support victims of climate change; (iv) the Koronivia joint work on agriculture; (v) the gender action plan; and (vi) the platform of local communities and indigenous peoples, among other measures (COSTA; MATA DIZ, 2020, p. 374).

Therefore, in 2019, at the fourth meeting after the signing of the Paris Agreement, an intermediate solution led the event to be divided into two sessions. The meeting that took place in Madrid was divided into "blue" sessions and "green" sessions.

The "blue sessions", organized by the host, dealt with the negotiations related to the Kyoto Protocol and the Paris Agreement. On the other hand, the "green sessions", were organized by other actors, aimed at dialogue with civil society on specific issues, e.g. indigenous peoples and S&T+I (science, technology and innovation).

With regard to art. 6, on that occasion, no consensus was reached on national sovereignty and the voluntariness of the parties' obligations in the face of international cooperation. It should be mentioned that some alarming data emerged from this event: (i) the oxygenation of the oceans is scarce; (ii) Greenland is melting seven times faster than in the 1990s; and (iii) 25% of the world's population is at risk of water scarcity, due to global warming (COSTA; MATA DIZ, 2020, p. 379).

It was during 2022, after the interruption of meetings due to the

pandemic scenario, that discussions rekindled the need to have a climate regime compatible with the declared scientific emergency: it is essential to have a system that includes the three axes of the Agreement – mitigation, adaptation and cooperation/support, so as to circumvent and anticipate the damage that is and will be caused.

At this meeting, which took place under the effects of the pandemic, it was the subject of many discussions and permanent tension combined with international pressure to achieve the necessary measures to achieve the objective that had been outlined in 2015. The main aspects can be summarized as follows:

- a) “Closing” of art. 6 of the Paris Rulebook: Paris Agreement that recognizes the need to implement cooperation mechanisms through a clearer, more coherent system based on consensus. In this sense, cooperation mechanisms were discussed based on the so-called rulebook that should precisely define the extent to which such mechanisms should be implemented by the Parties. It was also agreed that the States must detail and report the level of emissions from a base on which the reduction measures that must be taken will be determined. The agreement on the new carbon market rules closes some of the gaps that had been considered over the years and creates a more robust trading regime between States, however, the language was not considered clear enough to prevent possible distortions and deviations.
- b) Agreement on Forests and Deforestation: The importance that forests play in keeping warming below 1.5 was finally recognized with a multifaceted agreement to halt and reverse deforestation and land degradation by 2030. Highlights include: (i) the creation of a fund of approximately 19 billion dollars, through public and private financing, destined to the protection of forests, whose contribution would be given mainly by developed countries, with a public commitment assumed by the European Union, Canada and others; and (ii) association between the 28 countries, main producers and consumers of products linked to deforestation, to boost trade in sustainably produced commodities. The European Union, based on a supposedly declared extraterritoriality based on fundamentals of high environmental protection, has already been adopting rules of general application such as the proposal for a regulation on the carbon adjustment mechanism for borders<sup>6</sup> and wood

<sup>6</sup> Proposal for a Regulation of the European Parliament and of the Council creating a carbon border adjustment mechanism, Brussels, 14.7.2021. COM (2021) 564 final, 2021/0214 (COD). In the text of the proposal, it draws attention that “this mechanism is an alternative to the measures that address

itself<sup>7</sup> (MATA DIZ and ARAÚJO, 2021); iii) a commitment by several financial institutions to eliminate investments in processes or actions that promote predatory actions or deforestation, by 2025, in a clear shift in focus from the productive sector to the financial sector, reaching not only the classic productive chains, but now also investments and finance in general. Noteworthy, in this sense, is the Union Regulation creating a taxonomy for sustainable investments (Regulation (EU) 2020/852).

- c) Methane agreement: around 107 countries have signed the Global Methane Pledge, which will have as its target a 30% (thirty percent) reduction in methane emissions by 2030. With the current signatories, the commitment would be equivalent to closure of more than 1,000 (one thousand) coal-fired thermoelectric plants. If China achieves a similar reduction through its bilateral agreement with the US, the number jumps to more than 1,700 (one thousand seven hundred) coal-fired power plants, according to the Clean Air Task Force.

The negative point was that Russia, China and India did not sign the Agreement, representing a significant low adherence to the agreement given the magnitude of the States mentioned in the generation of this type of gas.

- d) Coal Agreement: this instrument, which had been discussed since the Copenhagen COP, unfortunately, did not include the participation of different States that use this input, such as India, China, United States, Australia, Japan, South Africa, which represents a weakening in the negotiations and in the conformation of a more robust agreement that effectively results in a reduction of fossil fuels.

With regard to adaptation, greater detail was expected of the overall goal of adaptation, which would be to increase adaptive capacity, strengthen resilience and reduce vulnerability embodied in the third axis of the Agreement (cooperation and support). The purpose of this target is to have a clear objective and follow-up, as well as the mitigation target. With regard to the global goal of adaptation, a work plan was adopted so that it gains greater strength next year, until the next COP to be hosted in Egypt.

Finally, COP26, held in Glasgow, Scotland, took steps towards operationalizing the Santiago Network, part of the Warsaw Mechanism. That

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the risk of carbon leakage in the EU's Emissions Trading System ('EU ETS') and is meant to avoid that the emissions reduction efforts of the Union are offset by increasing emissions outside the Union through relocation of production or increased imports of less carbon-intensive products. Without such a mechanism, carbon leakage could result in an overall increase in global emissions" (EUROPEAN COMMISSION, 2021).

7 Regulation (EU) 2010/995.

is, uniting technical experts to provide targeted assistance to the most vulnerable countries. Thus, identifying and avoiding impacts that could cause significant losses and damages, avoiding them. These more vulnerable countries also sought the creation of a specific fund to deal with this issue, but this did not happen. In this aspect of climate change, it is important to unveil the precautionary principle to avoid significant damage.

## 2 PRECAUTIONARY APPROACH AND CLIMATE CHANGE

Risks can be conceptualized as the probability of occurrence of undesired effects, whose quantification or magnitude cannot be foreseen. They concern situations for which one cannot project, at present, their causal relationship with future consequences.

Risks thus produce a state of vulnerability or a threat to the violation of rights. For the analysis of the Precautionary Principle, anthropogenic risks are of interest, resulting from human actions or activities, even if related to natural events catalyzed by them. Dagnino (2007, p. 62) presents the following elements to be considered for the existence of risk: (i) nature of the danger; (ii) exposure potential; (iii) characteristics of the exposed population; (iv) probability of occurrence; and (v) magnitude of consequences.

Also, according to Mata Diz and Siqueira (2021, p. 156):

[...] the author presents two Cartesian formulas for calculating risk, which take into account Area (A) and Vulnerability (V):  $\text{Risk} = A + V$  or  $\text{Risk} = A \times V$ . Thus, if in a given location there is a risk factor, for example, a volcano, there would be risk factor 1. If the location has no direct or indirect presence of man, vulnerability would be equal to zero. Thus, according to the formulas presented, the calculated risk of a volcanic eruption could be equal to 1 or zero.

Obviously, other formulas or protocols can be adopted, but always taking into account the need to establish clear parameters that help the interpreter when faced with a concrete solution, given the complexities raised by the correlation between anticipation-risk-caution so as to avoid or minimize damage.

The precautionary and, therefore, anticipatory approach to damage is part of the concept of risk based on the threat or probability of damage, that is, an analysis that manages to establish causes and conditions, even if not fully understood, for example, the extent and the effects obtained, among others, but already, in a certain way, known. It is a holistic approach that entails a reliable scientific investigation and clearly determined premises

in order to minimize present and future effects and, if possible, circumvent the past ones, guaranteeing the effectiveness of sustainable development based on its consideration as a human right.

According to Reis and Pereira (2019, p. 143) “the climate regime, as is known, is based on the principle of common but differentiated responsibility among countries, and which aims to distribute equitably the share of burdens, obligations that each country must support in mitigation actions, and its internal adaptation capacity”, and for that, it becomes imperative to recognize the precautionary approach as a structuring and fundamental element for risk management and its consequent regulation.

## **2.1 Precaution and its consideration as a general principle of International Law**

With the dogmatic construction around the environmental theme, specifically the principles, there is a renewed performance of the national courts, to a certain extent strongly influenced by international treaties, in interpreting and applying said principles in order to promote greater environmental protection.

It is important to note that in this process, the principles developed within the scope of treaties and conventions – or customary law – were gradually recognized and applied by the courts and arbitral chambers, which contributed to their strengthening and subsequent (re)use at the time of formulation of the national policies and laws.

Akhtarkhavari (2009) is emphatic in stating that the principles of International Environmental Law allow the courts to facilitate dialogue between the parties in a way that is potentially sensitive to their needs, which ends up shaping the meaning of such principles in the *corpus* of the national system.

As Machado (2022) teaches, the conception of the precautionary principle was preceded, in German Law, by the *Vorsorgeprinzip* principle, in the 1970s, driven by the impact caused by World War II and the rapid industrial development, with direct consequences on health and the environment. Originally, the principle was intended to be extended to all sectors of the economy in order to reduce environmental loads, especially those derived from hazardous substances. Later, it was adopted in several international instruments, as well as by national laws that sought to increase the level of environmental protection (MATA DIZ; SOARES ALMEIDA, 2014).

At the international level, the precautionary principle began to be

developed within the framework of protection against marine pollution, expressly referring to it initially in the Ministerial Declaration of Bremen (1984) within the framework of the International Conference on the Protection of the North Sea, being included in subsequent conferences.

Since then, the precautionary principle has been included in most international instruments aimed at environmental protection, and can be found in the Vienna Convention for the Protection of the Ozone Layer (1985), as well as the Montreal Protocols (1987) and Kyoto (1998), the Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992), the UN Agreement on Transzonal and Highly Migratory Fish Populations (1995) and the Agreement on the Application of WTO Sanitary and Phytosanitary Measures (SPS Agreement – 1995), to name just a few of the main ones.

But it is in the United Nations Convention for Environment and Development (UNCED), of 1992, that the principle gained more prominence, being included in all the instruments of environmental protection arising from the event, including the Rio Declaration on Environment and Development, in its Principle 15.<sup>8</sup>

The ICJ had a new opportunity to apply the precautionary principle, in the Pulp Mills Case (*Argentina v. Uruguay*), in which Argentina argued its use both in the interpretation of the Statute of the Uruguay River, which provides rules on the use of the bordering river between both countries, and in the reversal of the burden of proof regarding the permission, by the Uruguayan government, to set up two pulp mills on its banks (MATA DIZ; SOARES ALMEIDA, 2014).

The Court limited itself to stating that a precautionary approach may be relevant in the interpretation and application of the Statute, it does not follow that it operates as a reversal of the burden of proof in the case in question<sup>9</sup>. In a dissenting opinion, Cançado Trindade, in addition to analyzing the constituent elements of the principle – risk and scientific uncertainty – highlighted his concern with the difficulty of the ICJ in using it:

[...] the Court, once again, preferred to guard silence on this relevant point. It escapes my comprehension why the ICJ has so far had so much precaution with the precautionary principle. I regret to find that, since 1973, the Court has not displayed more sensitiveness to the invocation of precaution before it, when it comes to

8 “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.

9 Pulp Mills on the River Uruguay (*Argentina v. Uruguay*), Judgment, ICJ Reports 2010, p. 61, for. 164.



protecting human beings and their environment, even well before the corresponding precautionary principle began to take shape in contemporary International Environmental Law. [...]. Yet, this latter has indeed taken shape, in our days, moved above all by human conscience, the universal juridical conscience, which is, in my view – may I reiterate – the ultimate material “source” of all law, and of the new *jus gentium* of our times. Be that as it may, the fact that the Court has not expressly acknowledged the existence of this general principle of International Environmental Law does not mean that it does not exist. There is nowadays an abundant literature on it [...] but, irrespective of that, one can hardly escape acknowledging the relevance of the consideration of at least its constitutive elements [...].

With regard to the multilateral system within the framework of the World Trade Organization – WTO, despite resulting in an even more “cautious” and ambiguous perspective, the Dispute Settlement Body of the said organization also recognized the existence of the precautionary principle, which would be applicable in the case of the provisional measures of art. 5(7) of the Agreement on Sanitary and Phytosanitary Measures (SPS)<sup>10</sup>. It is also interesting to note that the WTO understands that, after the adoption of some restrictive measure, there should be an effort to obtain additional information necessary for a more objective assessment of the risk, which would lead to a reexamination of the issue within a reasonable period (VARELLA, 2004).

Despite the doctrinal and even jurisprudential discussion on the recognition of the legal nature of the precautionary principle, given its relevance and indispensability for managing the risk linked to climate change, in its different aspects (general impacts on the environment on a global level), one must defend its nature as a general principle, therefore, inseparable from the very concept of sustainable development currently adopted, based on the Sustainable Development Goals created by the UN in 2015.

In the same sense, as expressed by Bertoni (2015, p. 22-23),

El principio de precaución se encuentra hoy consagrado en el Derecho Internacional principalmente como rector y proteccionista del ambiente, y se orienta a prevenir o evitar daños, graves e irreversibles [...]. Logo, percebe-se que existe uma lógica

<sup>10</sup> “In cases where scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures based on relevant information that is available, including information from relevant international organizations, as well as sanitary or phytosanitary measures applied by other Members. In such circumstances, Members will seek to obtain the additional information necessary for a more objective risk assessment and will accordingly review the sanitary or phytosanitary measure within a reasonable time”. In two cases concerning the suspension of imports of meat and meat products from the United States by the European Community (DS26 and DS48), the WTO Panel required that any trade restriction measure be based on a risk assessment and not on uncertainties inherent in laboratory research. However, the agency took a precautionary approach, albeit indirectly and collaterally, by distinguishing the need for a risk assessment and the political decision not to take risks (MATA DIZ; SOARES ALMEIDA, 2014).



e certo consenso entre autores. E continua a autora: “aún cuando dichos daños se encuentren em expectativa, em uma etapa, considerada como de riesgo o peligro de daño, es dicer cuando no exista certeza científica absoluta sobre su ocurrencia.

It should also be mentioned that the precaution is provided for in art. 192 of the Treaty on the Functioning of the European Union (TFEU) as a general principle of law to be observed in the implementation of policies aimed at sustainable development. Thus, at the regional/European level, its fundamental nature is consecrated.

## **2.2 How precaution and its relationship with risk should be analyzed in view of the impacts generated by climate change**

The correlation between risk and precaution can be not only glimpsed but also observed from the very definition of the principle, found in several international instruments, as already mentioned, based on the probability of damage.

It should be mentioned that risk management encompasses a future event, based on predetermined probability conditions, based on scientific evaluation.

Also, it should be mentioned that prevention is linked to prior knowledge of damage, established from environmental impact studies, which measure the events that can be caused by carrying out a given activity. Given the understanding and effective knowledge of the actions that will negatively impact the environment, the necessary measures were adopted to avoid or minimize them.

In the case of precaution, however, the probability of damage, therefore, of risk, can already give rise to precautionary measures on the part of those who carry them out, or even the prohibition of a given activity, in the face of uncertainty, that is, even if there is no full knowledge of the damage to be caused, fully linked to risk management (MATA DIZ; SANTOS, 2016).

Regarding risk management, especially when considering the interpretative legal premises that must ensure due environmental protection, supported by instruments and actions with a high level of protection, the following analysis can be adopted:

- a) The concept of risk when considering the “good” to be protected: the environment and its correlation with human life. The very definition of what is considered risk is still an object of attention. This is expressed

by Hurlbert *et al.* (2019, p. 700):

While the term risk continues to be subject to a growing number of definitions in different disciplines and sectors, this chapter takes as a starting point the definition used in the IPCC Special Report on Global Warming of 1.5°C (SR15) (IPCC 2018a), which reflects definitions used by both Working Group II and Working Group III in the Fifth Assessment Report (AR5): “The potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain”.

Therein lies the relevance between vulnerability and resilience (axis of the Paris Agreement), which are also subject to different definitions according to the understanding of each actor or each system, therefore, the adoption of a mandatory international regime to be observed by all actors is justified;

- b) The way of managing a future and uncertain event, but likely based on the potentiality of its consequences, as mentioned above. Management involves verifying, in each of the elements that make up the product, process, consumption or acquisition, the *modus operandi* necessary to obtain a certain result, in this case, greenhouse gas reduction, obeying the techniques established primarily according to the detection of the degree of risk (minimum, medium, high; minor or major; large or small; acceptable or not acceptable, degree 1, 2, 3, etc.);
- c) Obtaining results and controlling goals, with the creation of a common agenda to mitigate the negative effects that the risk may cause. At this point, the roadmaps already adopted for some specific situations (greenhouse gases) would be useful, as well as the completion of the measures set out in the “Rulebook” linked to the Paris Agreement, in particular art. 6 and the tools to implement financing for vulnerable countries.

It can also be said that the precautionary principle emerges, then, as an instrument that reflects a characteristic of human beings: the risk approach, according to which human beings aim to reduce the negative impacts to which they are exposed (BECK, 2008) or, in this case, to which it may be exposed. This approach has emerged as a new imperative of environmental policy, particularly applying to the theme of climate change, given its specificity, that is, risk management based on the probability of damage occurring.

When faced with a situation in which the effect of damage is uncertain, the precautionary principle demands a proactive posture in projecting risks. Of course, the aim is not to completely and absolutely eliminate

risks, given their inherent probability, but only to draw a difference between those that would be acceptable and those that would not (SILVA, 2009), based on the duty to mitigate damage and/or its threat, in addition to adaptation and support – axes of the Paris Agreement.

The application of the precautionary principle does not aim, therefore, to establish a zero level of environmental risk (unreachable goal), but to manage the serious and irreversible risks arising from human activities. For Gullet (2000), the precautionary principle does not advocate a zero risk policy; “it only requires that due importance be given to the protection of public health and the environment, whenever the amount of scientific information available is insufficient for safe decision-making” (THOMÉ SILVA; MATA DIZ, 2018, p. 49-50).

For this reason, and as a result of its nature as a principle, precaution should be seen as a general principle correlated with risk management which should, in turn, contribute to the development of legislation and jurisprudence, based on the need to combine economic and social development with environmental protection – the traditional tripod on which the concept of sustainable development rests.

On the other hand, the recent formulation of its content and scope can also result in an element of insecurity at the time of its application, as highlighted by Gonçalves (2013, p. 123), “[...] the current formulation of this principle does not appear with a clear practical content and is insufficient as a guide for the design of regulatory policies [...]”. The author makes his concern clear and further informs that “[...] Multiple controversies have arisen, in fact, regarding the level of environmental risk required to apply the principle, the role of economic and social consequences [...]”.

However, despite its dynamic and multifaceted character, this principle encourages responsible risk management, although there is a degree of uncertainty as to its delimitation in the face of reality. However, despite the ambiguity of the legal concept of risk, it can be said that it is close to ethics, as it is important to remember that, given the current state of risk in which the planet finds itself, this principle has been strengthened in the national and international political and legal field. “Stimulating both States and citizens to become aware and use the concept of precaution as an indispensable element for a better future and as a necessary tool to achieve sustainable economic development” (BERTONI, 2015, p. 21).

The Precautionary Principle evolves, therefore, based on the indispensability of adopting appropriate actions and measures to protect

the environment and human health against previously detected dangers, even when there is a certain degree of scientific uncertainty in relation to these. So:

Precaution differs, in this regard, from prevention, a legal principle according to which one must act to prevent the occurrence of environmental damage, adopting all possible measures for its prevention or mitigation. The danger of damage linked to prevention is real and concrete, with no scientific uncertainty about its verification or its limits, that is, it is a “known” damage that can be circumvented (MATA DIZ; SIQUEIRA, 2021, p. 153).

It is undeniable, therefore, that considering the risk-anticipation-caution triad, as already discussed, the principle is used to establish specific methodologies for risk analysis and management, minimizing the occurrence of damage. There is no doubt that it is in risk management that the postulate of present and future generations is realized.

## CONCLUSION

Once the analysis of the objective proposed in the present research has been carried out, that is, to verify to what extent the nature of the precautionary principle –from its consideration as a general principle of Law – could impact on the risk management measures necessary to combat the adverse effects generated by climate change, some final considerations can be made.

Consideration of the precautionary principle from the recognition of its general nature, applicable *erga omnes* and with binding effect, would facilitate the recognition of climate change itself as a catalyst for actions derived from an anthropogenic action that could even cause negative effects that could result, in the future, in the unsustainability of life on planet Earth, disregarding the pressing need to preserve the environment for present and future generations.

Therefore, it is in this context that the defense of the principle finds shelter, that is, the conception of the principle as a guide for anticipatory actions of damage, considering, as mentioned, the indispensability of risk management measures that emanate from the recognition of the effects caused by climate change.

Although the content of the principle is not fully delimited, given its own anticipatory essence, the necessary efforts must be made in the face of the reality currently experienced. In other words, complex natural

phenomena that put different communities at risk.

From a propositional perspective that comes close to the objective of this research, some parameters could be established that, if correctly applied, would link decision-making at international and national levels to the observance of the principle, based on its general nature. Such parameters, even if merely illustrative, could serve as a starting point for solving doubts regarding the content of said principle.

The main one resides, undeniably, in the reliability of scientific and technological knowledge designed to solve risks, not just damages. Another noteworthy aspect is the duty of care that should guide all human action that is likely to cause negative impacts on the environment, according to the recognition that, when considering a human right, it is necessary to establish high-level measures of high level protection, as is the case, for example, with the protection of so-called vulnerable groups, that is, minorities, children, adolescents, the elderly.

It is up to science, technology and innovation to fulfill the content of the principle, considering the technical and scientific knowledge that is increasingly destined to the analysis of future and uncertain events, but whose effects, if materialized, may pose risk to human life, as already mentioned.

It should also be mentioned, in the wake of the assumption of the precautionary principle and its general nature, that the international regime that will rule on climate change should be based on the adoption of mandatory international acts, whose singularities could be determined based on the principle of common but differentiated responsibility.

It appears that the principled matrix of international environmental law, whose roots go back to the Stockholm Declaration and subsequent international instruments such as the UNCED/Rio 92 Declaration, SDG's 2015 and Agenda 2030, emerges as a robust normative collection whose spectrum is currently widely recognized, whether by the international system itself when applied by international courts and the preparation of new agreements, or by domestic systems that incorporated, to a greater or lesser extent, such a matrix, as is the case of precaution.

There is, therefore, a protective system of an international nature that had already been the subject of debate and consensus in past decades, which makes it possible to create new regimes aimed at increasing the level of environmental protection. The consideration of this or that principle as being general in nature cannot prevent actions that may reach such a level.

Finally, even if the current catastrophes draw a gloomy scenario, one should maintain a hopeful outlook since international regulation, as required by communities and people themselves, has become increasingly protective and more attentive to deviations and distortions caused by human action. It is really about the survival of the human being, including the actors who, still anchored in outdated foundations and/or conniving with outdated and wrong information, deny the effects arising from climate change. Looking to the past, one can also understand the effects that will occur in the future, albeit uncertain.

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