PREVENTION AND CONTROL OF ENVIRONMENTAL HARM IN THE CONTEXT OF DISASTER LAW: A FINANCIAL AND BUDGET APPROACH

PREVENÇÃO E CONTROLE DE DANOS AMBIENTAIS NO CONTEXTO DO DIREITO DOS DESASTRES: UMA ABORDAGEM FINANCEIRA E ORÇAMENTÁRIA

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Abstract: *Disasters, understood as collective calamitous events of great magnitude and with distinct consequences for a community, have become increasingly common and global. The situation facing a disaster already requires care in itself. Added to the vulnerabilities of the people affected, they have proven to be of fundamental importance, including safeguarding the rights of all those involved. Therefore, considering that the impact of a disaster is directly related to social and environmental vulnerability, it was raised a research question. If the greater is the vulnerability, the greater would be the impact of the disaster on a population and, consequently, the greater would be the human rights violations? Thus, it was hypothesized that if those most affected by a disaster are in a vulnerable situation, then the impact of a disaster on them is higher. Based on these premises, this study aims to analyze the relationship between disaster, vulnerability, and risk society, related on the correlation with the phases of the disaster cycle. To reach this goal, it is used the inductive method combined with a literature review on disasters, risk reduction, vulnerability, and human rights. Given the above, there was a need to promote cooperation between States and the international community with more efficacy. That may create a culture of prevention based on the reduction of vulnerabilities, for the correct confrontation of disasters through the adoption of risk management measures, allied to a need to build environmental rationality to create a new sustainable reality in the world.*

Keywords: *Disaster Law. Environmental Harm. Prevention and Control. Financial and Budget Approach. Environmental Protection.*

Resumo: *Os desastres, entendidos como eventos coletivos calamitosos, de grande magnitude e com consequências distintas para uma comunidade, tem se tornado cada vez mais comuns e globais. A situação diante de um desastre já requer cuidados por si só, e somado às vulnerabilidades das pessoas afetadas têm-se mostrado de fundamental importância, inclusive para resguardar direitos a todos os envolvidos. Considerando, portanto, que o impacto de um desastre está diretamente relacionado com a vulnerabilidade social e ambiental, questiona-se se quanto maior a vulnerabilidade, maior seria o impacto do desastre em uma população e consequentemente, maiores seriam as violações de direitos humanos? Dessa forma, tem-se a hipótese de que se os mais afetados por um desastre se encontram em uma situação de vulnerabilidade, então, o impacto de um desastre é maior nessa população. Baseado nessas premissas, este estudo tem como objetivo analisar a relação existente entre desastre, vulnerabilidade e sociedade de risco, a partir da correlação com as fases do ciclo do desastre. Para isso, utilizou-se o método indutivo, aliado a uma revisão de literatura sobre desastres, redução de riscos, vulnerabilidade e direitos humanos. Diante do exposto, verificou-se a necessidade de promover a cooperação efetiva entre os Estados e a comunidade internacional, criando uma cultura de prevenção baseada na redução das vulnerabilidades, para o correto enfrentamento dos desastres a partir da adoção de medidas de gestão de riscos, aliada a uma necessidade de construção de uma racionalidade ambiental com o intuito de criar uma nova realidade sustentável no mundo.*

Palavras-chave: *Direito dos Desastres. Dano Ambiental. Prevenção e Controle. Abordagem Financeira e Orçamentária. Proteção Ambiental..*

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Introduction

Disasters, whether natural or human-made, affect thousands of people. When they happen, they do not affect everyone in the same way because the ability to reconstruct and recover after the event is quite diverse due to vulnerability, which is a crucial factor to be considered. It relates to the four phases of the cycle of a disaster. Poverty is one of the biggest causes of the worsening vulnerability, which is difficult for the affected people to recover. Thus, that may result in higher doses of violation of human rights. At the exact moment when a disaster occurs, there is no selectivity of who will be affected. However, how people will recover from it is what differs a lot. In this context, the human rights protection systems, through the Treaties and norms regarding the theme, play a paramount role in preventing violations when an event takes place.

Therefore, considering that the impact of a disaster on those involved is directly related to social and environmental vulnerability, I raised a question. If the greater is the vulnerability, the greater would be the impact of the disaster on a population and, consequently, the greater would be the human rights violations? If those most affected by a disaster are in a vulnerable situation, then the impact of a disaster on them is higher. Thus, the relationship between the vulnerability and disaster variables intensifies due to various causes, such as poverty, the lack of adequate information on prevention and on appropriate actions right after a disaster, housing in risk zones, the lack of a network structured support to act promptly in eventual cases, etc. They contribute to the aggravation of the vulnerability of the victims of a disaster.

Based on these premises, this study aims to analyze the relationship between disaster, vulnerability, and risk society, from the correlation with the phases of the disaster cycle. For this, I used the inductive method, starting from specific data. I sought to infer a general truth, initially not contained in the examined parts. "Therefore, the purpose of inductive arguments is to lead to conclusions whose content is much broader the premises on which they are (MARCONI; LAKATOS, 2003). Thus, through a literature review on disasters, risk reduction, vulnerability, human rights, plus cross-referencing of information obtained from the analysis of relevant legislation, this study was divided into three parts. The first one brings the concept of disasters, the emergence of international environmental law, and some international documents on the subject. The second one addresses the relationship between risk society and disasters. Finally, the third one focuses on examining vulnerability as a factor that worsens the situation after a disaster happens.

In the final considerations, it will be concluded that continuing to act indiscriminately with nature in favor of economics is not a wise option. The situation of a disaster already requires care in itself. Added to the vulnerabilities of the people affected, they have proven to be of fundamental importance, including safeguarding the rights of all those involved. Therefore, an adequate solution would be cooperation between States and the international community with more efficacy. That may happen with preventive actions and correct risk management, aiming at the construction of environmental rationality. In addition, the building of environmental rationality could mingle with a new look at how the relationship between risk society and the environment can contribute to reducing disasters and guaranteeing rights.

The method used in this paper is inductive method, through the demonstration of the current ecological crisis, its mode of operation and the extent to which it affects groups in conditions of vulnerability. The proposal is to list the facts that need to undergo urgent changes, in order, later, to offer solutions suitable for overcoming them.

The methodology is based on theoretical-bibliographic research, making use of the reading of books and articles, by national and foreign authors, which touch the theme, aiming to propose approaches that address the real problems that affect global society, in the matters of environmental harms in the context of the Disasters Law with a view of prevention and control with a necessary financial and budget approach.

A financial and budget approach according to disasters law

The Red Cross helped more than 900,000 people directly affected by disasters, according to

data shared on its website. They are a world institution known for important humanitarian work carried out daily. Besides, they also have reconnected approximately 7,000 families separated by disasters. Each year, its work impacts 40 million people affected by disasters, with an average of 60,000 disasters per year (RED CROSS, 2020).

Report *The Red Cross Red Crescent approach to disaster and crisis management*, reinforces these statistics. That demonstrates that in recent decades the world has seen an increase in disasters. In 1975, there were 100 disasters per year, and in 2010 there were more than 400 per year (RED CROSS, 2020).

According to ECLAC, between 1970 and 2019, Latin America and the Caribbean were affected by 2,309 natural disasters and these events caused 510,204 deaths, 297 million people were affected, and more than 437 billion dollars in damages" (CEPAL, 2020) .

Nevertheless, what does Disaster mean? Countless concepts can be constructed, but according to the United Nations International Law Commission General Assembly (UNITED NATIONS, 2016), "disaster means a calamitous event or series of events resulting in widespread loss of life, great human suffering and distress, mass displacement, or large-scale material or environmental damage, thereby seriously disrupting the functioning of society".

International Strategy for Disaster Reduction conceptualizes the word disaster as "a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources (UNITED NATION, 2009)".

Given these classifications, it appears that the disaster can be natural or human-made, but regarding the second type, there is an important consideration,

> In this sense, the ecological disaster can be caused strictly by human action, resulting from the development of activities and technologies considered dangerous and that involve a certain level of risk. It can be also the product of natural phenomena, which also affect human factors, such as the worsening of climatic phenomena resulting from global warming, mainly caused by human action. In many documents originating from international organizations, there is a predominance of reference to natural disasters, to the detriment of technological ones. However, it is interesting to emphasize that human actions that contribute to or intensify the effects of the disaster are intrinsic to the concept of natural disaster (SALLES CAVENDON; STANZIOLA VIEIRA, 2011, p. 182).

Therefore, although there is a difference in conceptual terms about the origin of a disaster, as natural or caused, these authors understand that even natural ones suffered some part of human action with environmental degradation. Environmental disasters can be understood as mixed because they have both natural and anthropogenic factors in their origins, corroborating this classification (CARVALHO; DAMASCENA, 2013).

In terms of international documents on the subject, in 1972, the Stockholm Conference, held by the UN, was one of the first meetings to structure global actions to face environmental challenges and represents a starting point for the development of the international environmental law, based on the 26 fundamental principles established at this conference, with emphasis on principles 1, 2, 24, and 25 (UNITED NATIONS, 1972).

The first principle brings the human right to live in a balanced and quality environment that allows them to enjoy a dignified life; the second one stresses that the earth's natural resources must be preserved in favor of current and future generations. Principles 24 and 25 address the need for cooperation between States and International Organizations to protect the environment.

The UN General Assembly considered the 1990s as a decade for reducing natural disasters, from the adoption of UN resolution 42/169, as it understands that in the last 20 years (between 1970 and 1990), more than 3 million people died from environmental disasters and more than 800 million suffered damage amounting to the sum of 23 billion dollars (UNITED NATIONS, 1988). Thus, in 1992, the Conference held in Rio de Janeiro was an attempt to reaffirm this commitment to

cooperation for preservation, environmental action, through 27 principles established there.

More recently, the Hyogo Declaration, a result of the 2005 World Conference on Disaster Reduction, which proposed a framework for action between 2005 and 2015, and deals precisely with the need to build a culture of prevention to reduce vulnerabilities through of an international strategic thinking of cooperation (PNRRC, 2005). At this Conference, the Hyogo Framework for Action (MAH) was therefore established, which is considered to be one of the most important instruments for implementing disaster risk reduction. It is divided into five priority areas and has as its general objective increasing the resilience of communities to disasters by reducing losses of lives, besides social, economic, and environmental assets (UNITED NATIONS, 2007).

The five areas contained in this document are: making disaster risk reduction a priority; know the risk and take action; develop greater understanding and awareness; reduce risk and be prepared and ready to act (UNITED NATIONS, 2007). These actions can be related to the first point of the disaster cycle stipulated by Farber, which is risk mitigation because they aim to prevent a disaster from happening, promoting actions directed to this finality.

In this sense, to collaborate for the increase of more preventive than restorative actions after the occurrence of a disaster, Carvalho (2020, p. 338) highlights a change in international law on disasters over the years, adding that "the first phase of International Disaster Law proves to be strongly focused on disaster response and humanitarian assistance, only recently expanding its scope and perceived role for the Law in the direction of disaster prevention and management".

Two examples are worth mentioning, considering preventive actions. The first one is in Cuba and the second one in Japan.

> In this sense, Cuba is one of the best prepared countries in the Caribbean to face the hurricane season. Seventy-two hours before a storm hits land, the national media issue alerts and civil protection committees review evacuation plans. Forty-eight hours earlier, authorities focus on warnings issued in high-risk zones. Twelve hours earlier, they protect houses, remove debris scattered in the neighborhoods and evacuate people. This early warning system has proven to be efficient. During 2004, when Hurricane Charley hit, 70,000 homes were damaged and four people died. The following month, when Hurricane Ivan hit, more than 2 million people were evacuated and no one lost their lives (UNITED NATIONS, 2007, p. 5).

In Japan, prevention occurs against earthquakes. Every year, the Japanese celebrate Disaster Prevention Day, and the population participates in drills for disaster preparedness, including both emergency workers and the general public (UNITED NATIONS, 2007, p. 5).

Continuing the analysis of relevant international instruments on the subject, another international document that deserves attention is the Operational Guide on human rights and natural disasters, prepared by the Inter-Agency Standing Committee (IASC). It brings up some challenges in the observance of human rights in the operational field after a disaster. And in this sense, it aims at protecting human rights, helps to identify the needs and interests of affected people, who are considered subjects of rights. They are responsible for identifying barriers and limitations to their protection, ensuring that humanitarian needs meet human rights standards (REFWORLD, 2008).

In practical terms, these guidelines have been divided into 4 parts. Part A is about protecting life, safety, and physical integrity, and the protection of family ties in the context of evacuations. Part B relates to rights related to the food supply, health, shelter, and education. Part C is related to housing, land, property, and livelihoods. Part D is related to documentation and free movement. All categories must be observed to fully protect and guarantee human rights in disasters. However, the guide recommends that parts A and B should be prioritized in emergencies, and parts C and D in later stages (RefWorld, 2008). Given these international standards, it is clear that "Disaster risk reduction, as a duty of international law, takes shape from a series of international normative bodies, principles, and guidelines, as well as binding and non-binding norms of the same level"(CARVALHO, 2020, p. 348).

Finally, it remains to mention the UN 2030 Agenda, on the Sustainable Development Goals (SDGs). There are 17 SDGs and 169 targets. They are all integrated and indivisible.

> They are integrated, as they reflect in a balanced way the three dimensions of sustainable development: social, economic, and environmental. They are indivisible, as it will not be possible to advance just one of the SDGs. It will be necessary to work towards all 17 SDGs to make sustainable development a reality (UNITED NATIONS, 2020).

Thus, considering the need for integration and indivisibility, the importance of sustainability for the permanence of life on the planet is recognized. Thinking about collaborating with these goals, this study brings the relationship between vulnerability, risk society, and disaster as a way to contribute to avoid human rights violations.

The environmental risks impacts in the complex society

Ulrich Beck's logic of wealth distribution and risk distribution is nothing more than this relationship between vulnerability and disaster stated in another way because the risk is greater where there is lesser distribution of wealth. For the same reason, the impact of disaster is greater where there is more vulnerability. After all, it all boils down to a lack of resources to prevention, mitigation, and reconstruction. Thus, "the modernization process becomes "reflexive" converting itself into a theme and a problem" (BECK, 2011, p. 24).

Edith Weiss has a similar position, since, "Developing countries will very likely suffer the worst effects from climate change because they have the least resilience and capacity to adapt" (WEISS, 2008, p. 616). In other words, modernity brings with it social conflicts in a society that distributes wealth and risks. The current risks are global and affect everyone, being characterized as a collective risk generated through economic and industrial development, and "...they threaten life on the planet, in all its forms" (BECK, 2011, p. 26).

Thus, the risks of modernity emerge with a universal reach but at the same time its harmful effects are unimaginable and immeasurable. This can be seen in disasters around the globe. Risks are expressed in a future component in an extent of foreseeable damage, relating to the anticipation of an imminent event. "The core of risk awareness is not in the present, but in the future" (BECK, 2011, p. 40).

Klaus Bosselmann brings an interesting comparison between sustainability and justice. According to the author, injustice is tolerated more than unsustainability and these results from two main reasons and can be verified in the following ways: while current societies are considered fair, they, on the other hand, are not seen as sustainable. In addition, lack of sustainability is tolerated more than injustice, and this happens because the effects of harmful actions by people to the environment are not felt in the short term (BOSSELMANN, 2015, p. 26).

However, he points out that in the past this took even longer, but nowadays it is necessary to see sustainability with the same urgency and importance of justice because the future is now and the effects are happening in the present. And the warning comes as follows, "We are failing to fulfill the most basic obligation of each generation, namely, to provide for the future of our children"(BOSSELMANN, 2015, p. 26) and corroborating this relationship, Alberto Acosta elucidates that, "That is why we accept environmental and social devastation in exchange for achieving "development" (ACOSTA, 2016, p. 207).

In that regard,

> For many centuries, humanity did not have to worry about the impact of productive activity on the environment – nature managed to accommodate deforestation, the use of coal and oil, etc. However, we cannot be sure that today we are not approaching a turning point – we cannot be sure at all, because the moment when certainty is possible would be too late (ŽIŽEK, 2011, p. 367).

Considering this relationship between justice and sustainability, it would be unfair to live today at the expense of future generations. Besides, this is also a violation of human rights. What is sought is a sustainable development that allows generations to have a future (BOSSELMANN, 2015, p. 28). In this regard, Weiss brings the Theory of Intergenerational Equity with three principles that must be clear to facilitate its application and implementation. They must be general and capable of being used and adapted to different cultures. These principles are: options, quality, and access. Thus, it is the function of current generations to maintain the diversity of nature to allow future generations the option of making choices that meet future values. The same sense considered to the other two, since the quality of the environment must be maintained for future generations and access to natural goods and their resources must continue to take place without discrimination and in a broad manner (WEISS, 2008, p. 616-617).

It is considered that the concern with environmental degradation intensified from the 60s and 70s onwards because of a civilizing crisis, which required a new way of thinking and acting, given the climate changes that affect human life on our planet (LEFF, 2017, p. 225-226). Since then, the occurrence of disasters has worsened with climate change advancing, and although disasters are more frequent, there is no joint action in the world to prepare and prevent them from happening. In this sense, "Disaster planning is a significant activity, but it is not at the top of governments' agendas" (FARBER, 2013, p. 37-54).

On the subject, Enrique Leff brings an important criticism. A sustainable future is questioned because a social reorganization is necessary, i.e., the environmental crisis requires a new way of thinking about the world, through the conditions of life on our planet. Since he does not see this happening, he considers that there is an unsustainability of life produced by humanity bringing with it an urgency to rethink the civilizing process (LEFF, 2017, p. 225-226). The author also elucidates that "sustainable development is not very durable, because it is not ecologically sustainable" (LEFF, 2008, p. 81-90).

About this, the author adds that

> The transition towards sustainability will not be produced by a transcendental dialectic o the greening of the world; it involves the construction of a new rationality and its incorporation into social actors capable of mobilizing a set of processes that enable the achievement of its purposes (LEFF, 2011, p. 37).

Thus, the proposal would be to think of a transition to a sustainable economy based on other production principles, other than the capitalist mode, based on what the author calls "new productive rationality". That means new ways of producing goods and knowledge, as there is no way to maintain a growing economy at the expense of a finite nature. The construction of this environmental rationality is a complex process of deconstruction and reconstruction, which is not done overnight, or with the greening of the economy, as the solution is often disclosed. Therefore, it is necessary to build a new way of being in the world, with "...new processes of meaning of nature and new existential meanings in the construction of a sustainable future" (LEFF, 2011, p. 37).

The concept used by Alberto Acosta would be called "*buen vivir*", that is, "an opportunity to collectively build new ways of life," as alternatives to development, because in this context of an unsustainable, consumerist, and predatory lifestyle, it remains to be clarified that the world has become dichotomous, marginalizing classes, bringing divisions to pursue a development model brought by those who build and distribute wealth and stipulated as a goal (ACOSTA, 2016, p. 209). "In fact, a dichotomous structure of domination was accepted (or rather, it was consolidated): developed-underdeveloped, civilized-primitive, advanced-late, poor-rich, center-periphery..." (ACOSTA, 2016, p. 205).

In this context built by developed countries to explore other developing countries, the ideal of one day reaching the level stipulated by the former becomes a veiled utopia for others. And, attempting to grow at all costs, the human being separated from nature and believed that the ends justify the means, allowing the devastation of the environment as a necessary condition for development. About this,

> If the idea of development is in crisis in our intellectual landscape, we must necessarily question the concept of progress, understood as the productivist logic of having more and more, which emerged in force some 500 years ago in Europe. To crystallize this expansive process, capitalism consolidated that vision that placed the human being, figuratively speaking, out of nature. Nature was defined without considering humanity as an integral part of it. And with that, the path to dominate and manipulate it continued accelerating (ACOSTA, 2016, p. 208).

Thus, environmental rationality has a lot to contribute to the construction of a new reality intending to allow life to continue to exist on the planet. This understanding of the human being as something totally separate from nature is contributing by leaps and bounds to the end of the human species. The incessant search for development has resulted in a necessary search for life.

Considering this alarming scenario, it was expected that disasters would increase in frequency and intensity, and this reality has contributed to a perception of the need for risk management and global costs aimed at reducing the adverse consequences of these events. These actions are planned considering vulnerability because "It must be considered, as the environmental justice movement emphasizes, that environmental risks are not evenly distributed, and that factors such as poverty, ethnic, or racial composition may be at the center of the distribution of these risks and environmental costs" (SALLES CAVENDON; STANZIOLA VIEIRA, 2011, p. 181). Therefore, it is considered that when a disaster happens, it does not affect everyone indistinctly.

Environmental disasters underscore the importance of protecting human rights and the longer their effects last in the affected community, the greater are the chances of human rights violations, as they bring challenges such as lack of security and increased crime, difficulty in accessing basic health services and access to clean water and quality food, separation from families after the event, loss of documents, and so on (HUMAN RIGHTS AND NATURAL DISASTERS, 2008).

These negative impacts arising from disasters are exacerbated by the lack of public policies to help people who have suffered some loss, and the lack of actions aimed at preventing the disaster. In this sense, actions must be constant, involving the four phases of the disaster cycle.

It is important to emphasize that actions aimed at these victims cannot be uniform and standardized to promote equal treatment for all. Vulnerabilities must be considered in each context. Furthermore, it should be considered that international human rights instruments provide them with protection in the event of disasters. Furthermore, in many cases, these rights are already contained in the Constitutions of the States, and are, therefore, part of an apparatus of guarantees that must always be observed. Thus, "It can be seen that this dimension of environmental justice and environmental vulnerability highlights that the human rights have an environmental dimension and, at the same time, proposes a "humanization" of the approach to environmental issues (SALLES CAVENDON; STANZIOLA VIEIRA, 2011, p. 191).

The sooner the international community joins the States that have suffered a disaster, aiming to protect human rights and guarantee that basic needs are met, the lesser the violation of these people's rights will be.

In that regard,

> Environmental justice based precisely on the approximation between these legal systems, emphasizing the relationship between environmental degradation, discrimination, and poverty, and the violation of human rights. It is centered on a set of substantive and procedural social and environmental rights provided by both environmental law and legal systems for the protection of human rights (SALLES CAVENDON; STANZIOLA VIEIRA, 2011, p. 191).

Human rights and the environment are considered to be interdependent and respect for the former is a condition for sustainable development, just as environmental protection is a condition for the effective enjoyment of human rights.

Vulnerability, prevention and control of environmental damage

Vulnerability has several concepts and characteristics. Being vulnerable is a characteristic of the human being that permeates human existence, varying in intensity according to the context. Thus, what changes would only be the degree. That means that everyone is vulnerable and the difference is on how much each one has of vulnerability, which can vary at a certain time or stage of life. Thus, the degree of vulnerability relates to a factual situation, a social context, or social relationships, as the human being has a vulnerability that changes throughout life and that cannot be totally suppressed, only minimized or reduced. Vulnerability, therefore, is altered by social factors, which shape the individual and which go beyond human nature, and which are part of the context and life experiences.

Vulnerability is defined as "present in each and every one of us... There is no person who can be considered invulnerable" (BRITO FILHO *et al.*, 2014, p. 13). This perspective brings the notion of a vulnerability that belongs to the individual, for the simple fact of existing, as if it were not possible to think of one without the other, as it is inherent to being. From this view of vulnerability, it is understood that it is something that is part of the human being and that accompanies the subject throughout life, and must be respected and understood to contribute to their integral development.

Therefore, "Thus, all human beings are vulnerable because this is intrinsic to mortal nature, although vulnerability should not be approached in a negative way, as it speaks of our ability to react, resist..." (BRITO FILHO *et al.*, 2014, p. 13). This definition highlights the positive aspect of vulnerability and is extremely important, as usually the negative side of this concept is used more, as if it were an obstacle. Therefore, understanding it as part of a person and in a positive way, helps to understand the importance of recognizing its existence in the face of a disaster and how it can be a decisive factor in overcoming it, because "Vulnerability, ability to anticipate self (to cope and resist) and resilience (the means to recover from the impact of a disaster) seem to be the main factors distinguishing those who suffer losses and those who escape them" (CARVALHO; DAMASCENA, 2012, p. 91).

In the 1990s, in the public health area at Harvard, after the AIDS epidemic, the term vulnerability intrinsically related to the notion of risk reduction. The concept of risk, in turn, is related to other important terms in the medical field, which are risk groups and behaviors. Classification into risk groups in the early 1980s aimed at the institution of health policies for a specific target audience with actions directed at the prevention of AIDS cases based on a negative behavior on the part of those who already have the disease. Infected would not be able to have certain behaviors such as blood donation, injecting drug use, and sexual intercourse.

This posture of the health services demonstrated how the State acted hindering individual freedom in favor of the collective. The classification into risk groups can be similarly applied to the situation of helplessness of certain populations facing a disaster due to the lack of public policies and strategies for prevention and coping after an event.

The evolution of the concept of risk group was possible after harsh criticism by the people targeted by this classification and came to be called risk reduction strategies, with more access to information and prevention, to avoid certain behaviors considered to be risky. This evolution allowed a change in the treatment given to these people, which used to be invisible or isolated, and then became subjects of aid and protection policies. As for disasters, the analogy is valid, as with the Conventions and Treaties on the environment, the focus on the need for preservation and that they are finite resources, has changed with study and research, to develop sustainable actions that promote harmony between the human being, the environment, and the economy, with a change in the treatment of risk management.

Therefore, it is necessary to understand about risk management as a prevention, "Risk management aims to avoid, preferably anticipating the occurrence of a disaster. In cases where avoidance is not possible, management also includes planning mitigation and restructuring measures as quickly and effectively as possible"(Carvalho & Damascena, 2012: 90) considering this concept, initially risk management has a preventive nature in the cycle of disasters, but it can encompass other phases as highlighted above and it has an extremely important function because "...it accumulates this among other characteristics and seems to be one of the best ways to reduce

the vulnerability that so hard affects the most needy in the face of disasters, whether resulting from climate change or not" (CARVALHO; DAMASCENA, 2012, p. 95).

As for disasters, it is noted that it is necessary to be aware that vulnerable populations are more likely to suffer the impacts arising from that event because they reside in places of geographic risk such as slopes, for example, and have the situation aggravated by the lack of adequate information on how to prevent themselves in the event of a disaster, and this is of paramount importance, especially for those people who reside in high-risk locations, such as near mining dams, in the State of Minas Gerais, southeastern Brazil.

The problem of a State's absenteeism is shown by "(...) complacent coexistence with the problem on the part of the most powerful segments, a cooling of social reaction and the corresponding neglect of policy makers and financiers" (AYRES *et al*, 2009, p. 126). This situation, carried over to Disaster Law, can be analyzed in the following way: the State, through its action or omission, can aggravate a situation that is already dangerous and alarming enough. In the case of vulnerability, it would be the same as acting to aggravate them day by day, causing more social problems that accumulate without a solution. When a disaster happens, the lack of action by the State can greatly aggravate the situation of these people, even causing human rights violations. Thus, environmental vulnerability and greater exposure to risks and effects of ecological disasters can be factors that result in human rights violations, especially the right to life.

Moving on to an analysis of the term vulnerability according to Ayres, "(...) vulnerability analyzes involve the articulated assessment of three interconnected axes (individual, social and programmatic components)". In other words, they involve an individual, a social and a programmatic component (AYRES *et al*, 2009, p. 126). In short, the individual component concerns the individual's ability to understand and deal with vulnerability; the social one relates to access to conditions to learn and behave in situations of fragility; and the programmatic one involves State actions to monitor and channel resources to prevent and reduce vulnerability.

These three aspects can be used to understand environmental vulnerability in the event of a disaster. In the individual component, people who are victims of a disaster are vulnerable because of the economic situation in which they find themselves and because they do not have conditions for reconstruction in the short term. In the social component, poverty reduction strategies are needed, and they need humanitarian aid to have access to food, hygiene, housing to recover from a disaster. And in the programmatic sphere, it is up to each State to institute in its internal orders, programs, and actions to reduce the risks of disasters by implementing preventive actions.

Differentiating risk and vulnerability:

> If risk seeks to express the 'mathematical' chances of illness of an 'any individual', provided that they have a certain specific identity trait, vulnerability wants to express the 'potential' of illness/non-illness related to 'every one of the individuals' ' that lives in a certain set of conditions (AYRES *et al*, 2009).

Risk is related to vulnerability because risk situations are responsible for demonstrating the vulnerability present in a given situation, and can be understood as "...the risk is related to situations in which there would be a degree of predictability attainable even through of the probability/improbability binomial" (CARVALHO; DAMACENA, 2012, p. 87).

Would it be appropriate, therefore, to think about risk reduction and/or vulnerability reduction? Risk reduction as actions that minimize the chances of getting ill and reduction of vulnerabilities in an attempt to nullify certain conditions that lead to illness. Analyzing this in the field of Disaster Law, the situation is exactly the same, where one seeks, through the disaster risk reduction approach, to also reduce vulnerabilities.

In disaster law, the risk reduction approach is very important and, in this sense, "Risk can be defined as a function of (1) exposure to a threat, (2) susceptibility or sensitivity to damage or loss, (3) degree of personal or social protection, and (4) ability to deal with or adapt to the impact of the threat" (MARCHEZINI *et al.*, 2017, p. 45-46). Therefore, the approach must be directed towards identifying and reducing the main root causes of vulnerability to disaster. Therefore, countries must develop or modify policies, laws, and organizational frameworks, as well as plans,

programs and projects with the purpose of integrating disaster risk reduction. The actions provided for in international recommendations to deal with environmental disasters demonstrate that there is a concern to minimize the risks experienced by these people, acting from prevention to reconstruction.

To contribute to the broad understanding of vulnerability, an analysis carried out using the concept of intersectionality. The use of this term has now been expanded to define the enhancement of a situation of vulnerability imposed on a person or minority group. In this sense, discriminations when they occur together can limit the chance of success of those who are suffering from them because when faced with overlapping stigmatizing factors, there is an aggravation of vulnerability that makes that person a victim of such a situation, more limited than when discrimination is unique, or a single factor. In the event of a disaster, vulnerable situations accumulate, making victims even more susceptible to various violations. In this sense, "Climate change exacerbates existing vulnerabilities in developing countries, and both the economic costs of natural disasters and their frequency have increased dramatically recently"(CARVALHO, 2013, p. 401).

Thus, in discriminations practiced alone, it is assumed that the targets are different people, when in fact, they are not, as there are overlaps of discriminatory situations involving more than one factor, that is, "Intersectionality suggests that we do not always deal with distinct groups of people, but with overlapping groups" (CRENSHAW, 2002, p. 10). This perspective of vulnerability related to intersectionality can contribute to help in the analysis of the right to disasters. The overlapping of characteristics such as poverty, lack of information, living in risk zones for these people who are victims of disasters, can aggravate their situation. Considering these overlapping factors,

> Among the factors that can generate greater environmental vulnerability to disasters is poverty, which affects the ability of certain individuals and communities to prevent and protect themselves from ecological disasters. The greater difficulty in accessing certain information and even mobility, the need to occupy areas of risk and great environmental fragility or even to overexploit the natural resources of their environment to ensure their survival make the poorest the preferred victims of disasters (SALLES CAVENDON; STANZIOLA VIEIRA, 2011, p. 184).

This overlap analysis involving the forms of discrimination can be done by analyzing several variables. For example, using minority groups such as children and the elderly, who already have a vulnerability that is aggravated by the simple condition of being children or elderly, being, therefore, subjects of priority rights. Crossing this variable with the lack of a support network to take care of them in the event of a disaster, whether because they lived alone, in the case of the elderly, or because they lost their parents, in the case of children, contributes to a situation of greater vulnerability.

Another possible overlap to analyze involves poverty and human rights violations in a disaster,

> Relations between poverty and human rights in an environmental dimension are also evidenced, since unfavorable environmental conditions can be the cause of human rights violations, as well as their consequence, when it is verified that individuals and groups that are less able to effectively exercise these rights are the preferred victims of environmental risks and costs (SALLES CAVENDON; STANZIOLA VIEIRA, 2011, p. 187-188).

Given these considerations, among the measures that can be taken to minimize people's vulnerabilities to a disaster, there are the measures in the guides already discussed here, which encourage the cooperation of States and the international community to reduce the risks of disasters and actions for confronting and rebuilding communities after the occurrence of a tragic

In addition to these measures, the disaster cycle used by Daniel Farber can contribute to reducing vulnerabilities. According to the author, this cycle has four phases which are: prevention, mitigation, emergency response, compensation, and reconstruction. The first and second phases relate to events prior to the disaster and the others are focused on actions after the occurrence of the disaster (FARBER, 2013, p. 37-54). The author considers that to obtain an efficient risk management, each stage of the disaster cycle must be observed. There is no phase that is more important than the other, as at each stage, different measures are needed to minimize impacts and damage and make communities resilient, and with each disaster, the cycle starts over.

In the first phase, which is prevention, it usually starts after a disaster has occurred, in order to avoid another one of equal proportion. In that regard,

> The occurrence of a disaster should start a new cycle of learning and taking measures to avoid the next and possible disasters. Therefore, there must be a systemic assessment of which were the points of failure (structural, regulatory, third parties, physical factors, etc.) and which preventive measures should be incorporated into future events (CARVALHO, 2019, p. 2).

Thus, learning is crucial to avoid new events and losses. It is known that there is no way to completely avoid risk, and to guarantee absolute safety, but through prevention, the dimension and effects can be reduced.

In the second phase, which involves mitigation, it is found that it is essential to reduce the risks associated with the occurrence of the disaster because it includes the planning of actions to be taken, such as the construction of new infrastructure, such as reinforcement of dikes or dams for control flood control, land use controls to relocate homes to safe locations. Regardless of the action, it is crucial that there is risk management aimed at avoiding a worsening of the situation.

Emergency response is the moment right after the disaster. Actions are needed to help people get out of the place of risk, check survivors and save people who are still in danger, and help with basic supplies such as health, food, hygiene, and shelter. This phase is one of the most important to avoid aggravating vulnerability, because if the measures taken are not quick and effective, the victims are in a situation of helplessness.

The last phase is compensation and reconstruction. It takes place after the emergency, and attempts are made to reconstruct the disaster site and find those responsible. After the event, what remains to be done is to compensate for the losses and damages to mitigate the negative impacts. The better the other phases, especially the first two, are planned and executed, the less attention will be needed to this phase, as damage was successfully avoided and lives were not lost. But if there was no action or they were insufficient, a lot will have to be spent in this phase. Compensation to victims can come from private institutions, the government, non-governmental organizations, international humanitarian aid organizations, other States and even individuals who are aware of the situation they are experiencing. "The point of compensation is to give people the resources to begin to rebuild their lives" (FARBER, 2013, p. 47).

Analyzing these stages of the disaster cycle in a concrete case, one can see how important they are and must be done together. In the case of the Brumadinho dam in Minas Gerais, Vale made the following statement, reinforcing the understanding covered in this study, "Since 2019, we have carried out several actions to mitigate, repair, and support communities and people impacted by the B1 dam failure" (VALE, 2020).

The company has worked to prevent new disasters, reinforcing and monitoring dams throughout the state, and training the population and employees with evacuation plans in case of emergency, and quick and effective rescue actions. In addition, environmental recovery and remediation actions are carried out social construction, demonstrating that the 4 phases are being observed. The company has published a repair balance, and it is possible to follow up on all the measures and the planning prepared by the company to repair the damage and prevent further disasters (VALE, 2020).

In light of this analysis, it remains to be seen that the impacts of a disaster can be reduced or mitigated when the correct tools are used, as is the case with the stages of the disaster cycle, which guide the important actions in each phase to mitigate vulnerabilities and prevent deaths and losses. The aggravation of the disaster results from the social, physical, environmental and structural vulnerabilities of a community and is related to an increased risk experienced daily in certain places.

Concluding remarks

In general, when a disaster happens, the international community and the State where it occurred organize themselves to promote humanitarian actions. However, what is currently observed, with the frequency of disasters increasing and worsening in terms of consequences for the victims, is that attention to human rights has been a prominent factor that deserves care.

At the time of the disaster and after it, human rights gain more importance, attempting to safeguard the rights of people who have lost everything, bringing comfort through dignity with the basics, from access to livelihoods.

In this study, it was started from the premise that those most affected by a disaster would be the most affected by a disaster because they are in a situation of vulnerability. It was also found that the measures to be taken to reduce the risk of disasters and their consequences necessarily involve facing up to the vulnerability generated by poverty and the inequalities in the distribution of the resulting environmental risks and costs.

Based on the analysis of the impact and reconstruction report published by Vale after the Brumadinho disaster, this hypothesis was confirmed by demonstrating through data and indicators how much the needy population is facing difficulties in rebuilding their lives and moving on (VALE, 2020). The population affected by the disaster of the Brumadinho dam had its economy focused on the mining industry, being often the only source of income. One of the actions taken after the disaster was precisely training people to develop other productive activities and not depend totally on a single area of income generation.

Another important reconstruction action to reduce vulnerability was the investment in infrastructure in the affected areas, taking care of the environment through planting native plants and their preservation. In addition, there was the construction of key places in the community, such as gyms, squares, schools, daycare centers, public lighting, among other actions that contribute to the return to the routine of the affected people. This sense of belonging to a community is crucial to helping families return their lives to the *status quo* in the face of tragedy.

Therefore, it is necessary to understand the needs of the affected community and promote a culture of prevention based on the reduction of vulnerabilities, associated with poverty reduction to face disasters correctly.

In this sense, it is understood that this relationship is double, with disasters making it difficult to eradicate poverty, and on the other hand, the vulnerability of the poorest is greater in the face of a disaster. And regarding human rights violations, disasters pose a great threat to the survival, dignity, livelihood, and security of people and communities, especially the poor.

The role of environmental justice and prevention emerges to prevent human rights violations in a vulnerable population due to the disaster. Social inequality is related to other forms of environmental inequalities and this affects the victims' ability to deal with the disaster and even to prevent themselves because they lack information on how to proceed in these situations.

Thus, it is concluded that an adequate solution would be cooperation between States and the international community with more efficacy. It could exist actions and programs to reduce environmental damage to prevent the occurrence of human-made disasters and to raise awareness and global campaigns on how prevention can save lives. In addition, the adoption of specific measures aimed at correcting risk management, allied to the need to build environmental rationality to create a new sustainable reality in the world.

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