

TRANSBOUNDARY ENVIRONMENTAL DAMAGE: AN ANALYSIS OF CIVIL LIABILITY BASED ON ENVIRONMENTAL INTERNATIONAL LAW AND THE THEORY OF GAMES

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Abstract

The aim of this study is to analyze the civil liability for transboundary environmental damage (or bordering) in the operative relationship of causes, using international analytical tools of the game theory and international standards of environmental law (generally, treaties). An international cooperation of sovereign States on the global implementation of a healthy and balanced environment is claimed. By linking environmental damage with international environmental law and the theory of games, the text focuses on the strategic that will be defined by States, in order to prevent, or not, possible losses, regarding the polluter pays principle.

Keywords: Transboundary environmental damage; Civil responsibility; International environmental law; Game theory; Polluter pays principle.

INTRODUCTION

This article focuses on analyzing transboundary damages (or bordering) to environment, based on

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environmental international law and the theory of games, regarding States' supranational liability when searching for a more reasonable solution to predatory practices and/or to compensate those countries affected by them.

Transboundary damage is understood as a diffuse character, regarding the imprecise number of victims that suffered the effects of specific environmental degradation and their difficulties to define their law protections, due to the geopolitical boundaries, artificially patterned by human beings (BELTRÃO, 2014).

Thus, the research problem consists in analyzing if the agreements signed by sovereign States are effective to proceed with civil liability, regarding future transboundary environmental damages.

A proper literature review is adopted, using an opportune dialectic method, since it is guided by the international and domestic bibliography research, due to the transboundary environment preservation management, shared by sovereign States. The theoretical milestone is based on the doctrine that recognizes that international cooperation is able to analyze States, regarding territory and sovereignty.³

The specific objectives of this research are: (i) knowing the legal work evolution, regarding environmental damages caused beyond the boundaries of a State; (ii) analyzing, based on the theory of games, decisions made by States about activities, which cause potential negative transboundary impact on environment.

In order to develop the objectives proposed, this research is divided in two parts. In the first topic, it develops theoretical presuppositions regarding the liability of transboundary environmental damages, caused by another State. In the second one, the strategic chosen by States, in front of liability of transboundary environmental damages, is presented.

Therefore, the present work intention is justified by the impact that transboundary environmental produces and how it adversely affects a neighbor State's territory, which may achieve international public regions. Environment embrittlement is a huge concern, whose global and temporal damages, in most cases, become permanent or only partially recoverable. Therefore, all life forms' rights are affected. However, they should be diffusively and collectively protected.

LIABILITY AND PREVENTION OF DAMAGES TO ENVIRONMENT AS INTERNATIONAL STANDARD

In its first part, the research aims to highlight the transboundary environmental liability caused by another State that intends to protect their companies. This international scenario has been formed by the

³ Second Sant'Anna (2009, p. 190), cooperation is understood as "[...] a cooperation that goes beyond the conception and sees it as a non-linear and open gradual process, which influences international and domestic factors, and that may cause changes in the international system and the actors themselves".

contemporaneous complexity, presented by controversies originated in the boundaries between States, whose divisions are merely political.

Sant'Anna (2009, p. 187) points that transboundary communities, in general, do not really count with a specific legislation neither with governmental projects elaborated to their development. When similar actions are taken for this purpose, they are triggered by the national governments political power, related to their respective transboundary regions. For example, water resources between Brazil and Southern Cone countries.

It could be understood that the concern with environment is not recent. If it is true, during the decades of 1960/1970, a greater society's concern with a healthier environment was verified. Environment compensation issues were crucial in the beginning of international negotiations.

Stockholm Conference (also known as United Nations Conference on the Human Environment), carried out in 1972, was a milestone, regarding environmental damages liability. The Conference text reaffirmed the cooperation aiming an international law development even greater, when it is related to liability and compensation to transboundary damages victims.

During this period, the environmental culture had begun to be disseminated into the society, since general population and government's concerns were not in the direction of environmental problems.

Based on this scenario, Garcia and Garcia (2015, p. 204) emphasize that "We cannot talk about environmental protection under just a local view. The environmental protection must reach a transboundary sphere, not limited by boundaries".

For Cretella Neto (2012, p.74),

[...] The United Nations Conference on the Human Environment was the milestone of the International Environment Law first appearance, in 1972, issued at the end of Stockholm Conference, also in 1972, whose first principle states, in its first part, that human beings "have the fundamental rights to freedom, equity, and an adequate life in an environment with good quality, which permits living with dignity ...". On the other hand, "human beings should also improve environment to present and future generations";

The international liability for negative consequences became stronger in its 27th Session, carried out in 1975, in Geneva, Switzerland, by the International Law Commission – ILC. This meeting contributed to transboundary damages issues discussion and, in 1993, this subject was debated again in the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, in Lugano, Switzerland.

In 2000, Uruguay, under delegation, formed a work group to the preparatory meeting for the Inter-American Specialized Conference on Private International Law, in Washington, EUA. The issue "law conflicts on non-contractual liability, with emphasis on international civil liability for transboundary contaminations" has been discussed. In the opportunity, a document was elaborated, which compared the applicable legislation and jurisdiction — both related to civil liability for transboundary contamination — and included some environment

law basic principles and definitions already known.

In general, environment (water, air, land, animals, plants, and other living beings) is not only a responsibility of economic blocks, organizations or States. It is a global responsibility. There is no doubts that some activities present negative repercussion throughout interconnected nature, and therefore, of diffuse effect (without fixed rights of domain), which is a responsibility of all international or national community members.

For this reason, Carrá (2015, p. 29) points out the transboundary character of environmental damages, “Nature damages almost always exceed local or personal interest levels. Thus, it was established the affirmative that, most times, their impact is common, transboundary and intergenerational”. From this point, States’ civil liability was justified, due to traditional structures deficiencies of risks management.

Environment law importance is overweight by the society, due to changes caused by technologic advances, which demands growing interventions in favor of well-fare and social justice. Otherwise, environmental disasters reach transboundary effects, which affect society and ecosystems, becoming a concern that singly transcends a State and forms part of non-solved issues in global level.

In this point, activities that damage the environment have contributed to reduce life’s quality and time. For this reason, compensation (of a common good) is needed, aiming reestablishing the economic-judicial balance, changed by the responsibility damage generator.

Brasoveanu and Lisievici Brezeanu (2012, p. 1.050) believe that

The only way to ensure a safer future for humanity, more prosperous, is to identify and to gradually eliminate contradictions between environment and development. Each of us must assume a great responsibility for global environmental degradation, each of us must carefully consider habits of thought and action that reflect and have led to this serious crisis.⁴

Ahlf (2000, p. 97-98), in turn, understands that when an international obligation is violated, under specific circumstances, States are hold responsible. Since damages go beyond physical barriers of a country, the first problem faced is to know who is sponsored to claim for the international liability of those countries that have violated international environment law.

In this case, the State affected by transboundary damages has the right to claim the compensation due to the impacts suffered, notably when an environmental damage is caused outside its jurisdiction – estuary, high sea, geographic poles, air quality and climate changes.

Incidentally, Langshaw (2012, p. 22) address the conflict between Argentina and Uruguay, judged by the International Court of Justice, related to cellulose factories’ establishment in the Uruguay river, which have significant and procedural obligations related to the Transboundary Effects of Industrial Accidents (TEIA) conduction:

⁴ BRASOVEANU; LISIEVICI BREZEANU, 2012, p. 1.050.

The strong cross-border integration of a broadly strengthened civil society within the TEIA process is crucial to maintaining realistic checks on the process and on shifting control of the TEIA discourse concerning individual projects away from the State(s).^{5,6}

Another Dispute Resolution Request applied by the International Court of Justice comprised Costa Rica and Nicaragua, which were diplomatically litigating about environmental damages, occurred in a transboundary area. Sjöstedt (2013, p. 366-367) states that this territorial dispute was caused by natural variations in San Ruan riverbed, boundary of both countries, besides the riverside erosion and sedimentary deposits created by the military occupation of part of Costa Rica's territory. This fact caused claims to the adoption of Ramsar Convention rules, specially to protect aquatic birds' ecosystems and habitat⁷.

Transboundary damages discussion presupposes an international judicial liability, which, despite the obstacles, should establish a cause link between the act impugned and the damages caused. For example, the distance that separates the damage source, the temporal evolution of pollution effects, climate changes consequences, among others.

In this context, Gordilho (2015, p.95) presents two cases of judicial liability through the usage of environment law general principles, which can also be applied to international environment law, especially in cases of international disputes between States:

In 1959, the International Court of Justice, in relation to Corfu Channel case, affirmed that no State can use its territory for practicing actions that affect other States' rights, as well as the arbitration award about Lac Lanoux case - of November 19th, 1956 – referred to the rights of foreign States' affected by the pollution present in their boundaries. Also, the arbitral decision, of March 11th, 1941, about Trail Smelter case, regarding transboundary pollution, established what, for many people, is the international law general principal of environment: No State can use its territory when such usage affects other States' rights.

In fact, International environment law basic principles have been pronounced by the international jurisprudence. For example, in Trail Smelter case, when judges affirmed, in a decision made in March 11th, 1941, that "no State has the right of using or allowing the usage of its territory so that smoke causes damages to other State's territory or to the properties of their people".

This principle was consolidated in the item 21 of Stockholm Declaration and in the item 2 of Rio de Janeiro Declaration as one of the international environment law basic principles.

In this bias, it is clear that damages liability is established by polluter pay principle, which aims to attribute to the polluter the social costs of the contamination generated. Such principle was not expressly announced by legislator. Although, it is present in the Environment National Policy Law, Public Civil Action Law, and in the

⁵ LANGSHAW, 2012, p. 22.

⁶ INTERNATIONAL COURT OF JUSTICE, 2010.

⁷ In Brazil, Ramsar Convention, of February 2nd, 1971, was ratified by Decree n. 1905, of May 16th, 1996. Brasil, 1996. (BRASIL. Decree n° 1,905, of May 16th, 1996. Enact the Convention for Humid Areas of International Importance, especially as Waterfowl Habitat, known as Ramsar Convention, of February 2nd, 1971. *Diário Oficial da República Federativa do Brasil*, Brasília, May 16th, 1996. Available in: <http://www.planalto.gov.br/ccivil_03/decreto/1996/D1905.htm>. Access: May 30th, 2017.).

Federal Constitution itself (BRASIL, 1981; BRASIL, 1985; BRASIL, 1988)^{8,9,10}

Martins and Murari (2013, p. 10) referred to the second moment of polluter pay as “the moment of effective liability for damages caused, that is, occurring environmental damages due to an activity developed, the polluter is liable for restoration.

Exceptions to this principle are caused by integral risks that attract the absolute liability of restoring. For example, the hypothesis regarding damages caused by weapons and nuclear substances based on article 14, paragraph 1, Law n. 6,938/1981 and recent Superior Court of Justice jurisprudence (BRASIL, 1981; BRASIL, 2015).^{11,12}

This objective brings, to the main debate, possible State decisions based on theory of games, applied to policy and international relations, circumstance in which players observe other players in order to cooperate.

CHOOSING STRATEGIES RELATED TO CIVIL LIABILITY REGARDING ENVIRONMENTAL DAMAGES

Transboundary environmental damages affect the territory of more than one nation and reach

⁸ Art. 4º The Environment National Policy Law will search for: [...] VI – to preserve and restore environment resources, aiming their rational usage and permanent availability, enabling environment balance maintenance favorable to life; (BRASIL. Law n. 6,938, of August 31st, 1981. Provides the National Environment Policy, their purposes and formulation and application mechanisms, and make other provisions. *Diário Oficial da República Federativa do Brasil*, Brasília, August 31st, 1981. Available in: <http://www.planalto.gov.br/ccivil_03/leis/L6938.htm>. Access: May 18th, 2017.).

⁹ Art. 3º The civil action can aim the compensation in money or doing or not-doing obligation. (BRASIL. Law n. 7,347, of July 24th, 1985. It governs liability public civil action due to damages caused do environment, consumers, goods and rights, which present artistic, aesthetic, historical, touristic and landscape value (REJECTED) and make other provisions. *Diário Oficial da República Federativa do Brasil*, Brasília, July 24th, 1985. Available in: <http://www.planalto.gov.br/ccivil_03/leis/L7347orig.htm>. Access: May 18th, 2017.).

¹⁰ Art. 225. [...] Paragraph 1 [...] IV – require, under law statements, a previous environmental impact study, which will be published, in order to set a building work or activity that can cause significant environment degradation; (BRASIL. Constituição da República Federativa do Brasil de 1988. *Diário Oficial da República Federativa do Brasil*, Brasília, 5 out. 1988. Available in: <http://www.planalto.gov.br/ccivil_03/Constituicao/ConstituicaoCompilado.htm>. Access: May 18th, 2017.).

¹¹ APPEAL AGAINST COURT REGULATIONS (ART. 544 OF CPC) – ACTION FOR COMPENSATION – ENVIRONMENTAL DAMAGE – RUPTURE OF PIPELINE “OLAPA” – OIL SPILLAGE IN SERRA DO MAR – INTEGRAL RISK THEORY – PETROBRÁS OBJECTIVE LIABILITY – APPLICABILITY OF THE LAW THESES FIRMED IN THE RESP 1.114.398/PR, JUDGED UNDER REPETITIVE APPEAL RITUAL – ART. 543-C OF CPC – Monocratic decision established in Res n. 1.114.398/PR, Minister Rapporteur Sidnei Beneti, judged in 2/2/2012. DJe 2/16/2012, under the ritual of Art. 543-C of CPC, regarding the fact that theories of integral risk and objective liability incite environmental damages, and that it is completely applied to the specie, being the arguing about differences between non-civil liability raised during each case defense, irrelevant. Precedents. 2. Ineffective appeal against court regulations (BRASIL, 2015).

¹² Art. 14. [...] Paragraph 1. Without prejudice to penalties predicted in this article, the polluter is obliged, independently of guilty, to compensate or restore damages to environment and to third parties, affected by their activities. Public Prosecution of the Union and of the States is a legitimate party to file civil and criminal liability action based on the environmental damages. (BRASIL. Law n. 6,938, of August 31st, 1981. Provides the National Environment Policy, their purposes and formulation and application mechanisms, and make other provisions. *Diário Oficial da República Federativa do Brasil*, Brasília, August 31st, 1981. Available in:

international areas of common domain. For example, high sea, where all States involved have to be liable for their acts. However, there are sovereignty reasons that frustrate such purpose, as states Principle 21 of Stockholm Conference (UNITED NATIONS ENVIRONMENT PROGRAMME, 2006):

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.¹³

The idea of debating, in international level, the polluter pay principle defines the strategies States will take in order to protect themselves from possible environmental damages. Principle 22 of the Conference stress that States should cooperate when dealing with liability and compensation to the victims of pollution and other environmental damages, caused inside or out the areas under their jurisdiction.

Based on the weak result related to environment reached under Stockholm Conference management, UN Conference on Environment and Development was carried out twenty years later (also known as Rio 92, Eco-92, Summer Summit, Earth Summit or Conference of Rio de Janeiro), whose Principle 2 established the judicial details on which States should to be based, in order to explore their own resources, with liability in the frontline of their environment policies. The major Rio-92 legacy was raise environment issues to a global concern level. In the end of the Conference, States agreed in following a sustainable development model described in Agenda 21.¹⁴

In 2002, The World Summit on Sustainable Development (also known as Johannesburg Summit) was carried out on Johannesburg, South Africa. The objective was assessing the good results reached by Agenda 21 and other Eco-92 programs, until then, relegated, due to the fact that:

[...] globalization phenomenon, until then unknown by contemporary society, added to September 11th, 2001 terrorist attacks, changed international policy agenda priorities, leaving sustainable development in the background. (SERRAGLIO, 2013, p. 22).

The evolution of Johannesburg Summit, Agenda 21 and Rio-92 about sustainable development are frequently discussed by the UN Commission on Sustainable Development – CSD, comprising themes as: climate changes; ozone layer deterioration; biodiversity forests’ protection; prevention and contention of desertification; protection of endangered species, marshy areas, international watercourses, seas and oceans; transportation and storage of dangerous wastes; and production and management of dangerous chemical products and persistent organic pollutants (LUCON, 2013, p. 35).

<http://www.planalto.gov.br/ccivil_03/leis/L6938.htm>. Access: May 18th, 2017.).

¹³ UNITED NATIONS ENVIRONMENT PROGRAMME, 2016.

¹⁴ Second Amado (2016, p. 1), Agenda 21 is a document approved in Eco-92 “[...] a non-binding tool with global targets in order to reduce pollution and to reach a sustainable development. It is noted that such documents do not have a judicial nature of international treaties, since they do not formally integrates Brazilian legal system, but present global and local ethic and strong

In these circumstances, paradigms established as more important in the global agenda leave the field open to sustainable development and the search for a more human and supportive society. The fact that environmental degradation and other critical factors – as poverty, population growth, waste, health, urban decline, human rights violation, gender equity and conflicts –, are extremely important to economic, environment and social development, was not taken into account.

Until then, the international environment law had a major understanding that territories had to be freely and conveniently used, without any law limitation or constraint. Based on these convictions, Sarlet, Machado and Fensterseifer (2015, p. 654) comment the polemic relativism of States' national sovereignty, in the environment field, due to the transboundary nature of some predatory practices and their global repercussion.

Regarding the inalienable obligation of preventing and restoring transboundary environmental damages, Bianchi (2012, p. 277) states that “[...] these rules are characterized as soft law, that is, they are not mandatory for States, fact that certainly compromise the efficacy of the right”.

Environmental damages and their consequences reach not only human beings, but the entire surrounding environment. For example, the *guarani's* aquifer – the greatest transboundary underground freshwater fountainhead of the world – and the Amazon deforestation, which can negatively affect world climate, due to the release of carbon dioxide that is reason enough to justify the protection inter-States.

Sirvinskas (2016, p. 265) affirms that environmental damages, does not only affect legal interests protected, but also “[...] environment, since they are practiced through potentially polluter economic activities, commissive acts, or voluntary omission caused by negligence”. Regarding their acts, Carrá (2015, p. 31) writes that

As stated, although the first formulations, attesting the absence of natural obstacles to restrain damages to society, have risen due to Environment Law, which coined the concept of transboundary damage, there is a consensus today that almost all Law fields agree that the traditional judicial ways to later restore or approve are not able to adequately restrain such damages.

In this scenario, transboundary damage theme is increasingly discussed by the contemporaneous society, since consumerism is progressively raising and, as a consequence, the environment is depleted during this process.

Amorim (2015, p. 134) understands that transboundary damages go beyond countries' boundaries and affect other States:

Even though some authors, dedicated to environmental safety, point to the fact that environment and population pression may probably cause the increase of local conflicts, when compared to international ones, the possibility that these conflicts go beyond the boundaries – or, that they raise from two or more States, in relation to specific transboundary or border natural resources, or even to their respective vital or economic interest – is

authority”.

realistically possible.

Transboundary environmental damages have been present for a long time in the world, however, just from 1970 to 1980 the international community started to accept better the polluter pay principle as an effective international liability remedy to pollution damages.

Such principle always received a strong doctrinarian treatment, and has been studied as a system of rights and duties attributed to individuals or legal person, regarding specific behaviors. For example, Civil Right liability concept that, in the International Law, has its collective character stressed, since it comprises ensures and values which interest to everyone.

In this perspective, the final version of Responsibility of States for Internationally Wrongful Acts was approved. The first draft of Draft Articles Project – of the International Convention on International States' Liability was approved by ILC, during its 48th Session, carried out in 1996, and revised and improved in 2001, in the 53rd Session and, finally, issued to General Assembly, which adopted Resolution 56/83 in 01/28/2002.¹⁵ The document idea is based on damages affecting other country caused by other State.

In this particular angle, institutions created for this purpose are responsible for keeping environment balance and its population, since this is crucial to humanity success. It is also necessary to protect environment against possible damages, caused by those who not respect it. (GRANZIERA, 2015, p.16).

This leads to the necessity of another deepening, of same relevance: the imposition of a distressing sentence, with sanction prediction and hard law, to national States – sovereign over their territory –, which violate rules, in the hypothesis that the arbitral object used to solve conflict is limited in the duty itself, at the risk of affecting third parties rights.

Moura (2013, p. 16) comments that States' legitimacy to litigate inside environment law usually goes beyond territory, and

therefore, environmental litigation may occur, involving a sovereignty State violating environmental law inside its territory and a public or private entity, not related to a territory, but with genuine interest in the environment balance, which suffers impacts from all the globe, regardless physical proximity.

Transboundary damages issue faces uncertainties adopted by the polluter State, in order to try to protect itself against adversities. It is an economic structure formation of how States (players) have to play or prognose in front of a possible environmental degradation, since it permits assessing different strategies of the other actors, based on a diagram denominated "game tree of payoff".¹⁶

Halik and Delgado (2016, p. 110) describe international actors' behavior through gains or losses

¹⁵ UN GENERAL ASSEMBLY, 2002.

¹⁶ Second Migliavacca (2009, p. 261), *payoff* means payment/result, although, in the theory of play contexts, it is a group of possible results inside a game.

possibilities, following theory of games strategy. In such situation “Players will always try the best shot, that is, they will always be searching for the best payoff, which will not always be the best for society, since it could benefit better from Nash balance”.

In this perspective, Timm and Moser (2015, p. 666) comment about the necessity of stimulating cooperation that

According to bargain theory, in a cooperative game, as a private agreement, parties will cooperate in order to try to address the good or service to the one which give it more value. This will occur, since parties agree with the positive final balance to be shared among them.

Theory of games had its first theoretical milestone registered in John von Neumann and Oskar Morgenstern work during 1940 decade, named as John Nash balance concept in 1951. This concept has its applicability to economy recognized just in 1994, through the studies of John Nash, John Carles Harsanyi and Reinhard Selten, three pioneers awarded with Bank of Sweden Prize in Economics Science in Memory of Alfred Nobel (mistakenly named as Nobel Prize in Economics).

From this point, many others important developments have made theory of games an useful tool for economics studies. For example, the assessment of possible alternatives, previous facts, and norms established by moral, practices or law. Theory of games presuppositions are concerned with the way individuals make strategic decisions, aware that their acts influence on other players’ moves, who have the same objective.

Gaban and Domingues (2009, p. 101) points theory of games elements as “i) a list of agents that are making decisions; ii) a list of probable decisions that each agent can make; and iii) the description of how each agent assess possible consequences”.

Conceptions defended here consider some possible strategies used by players inside international environmental damages issues, since from payoff matrix analysis will be possible to estimate future decisions based on their result (best shot).

States’ cooperation should adjust their behavior, according to preferences established, by way of common expectations, when placing the player to a Pareto boundary¹⁷. However, actors cooperating through a diplomatic way would have better political results in more than one circumstance.

Goldin (2009, p. 65) characterizes a player turn, regarding its nature of choice, in *sincere* or *strategic*; regarding type, *strategic* or *based on random or on games coercion*; regarding the way of distributing resources, *zero sum games*, which one or other necessarily gains or losses, positive or negative sum games, respectively, when it is possible everyone gain or loss; regarding interaction style *non- or collaborative*; regarding interaction, *static* or

¹⁷ Second Oliveira and Gennari (2009, p. 177), Vilfredo Pareto was very important to welfare contemporaneous neoclassic economics, which “when elaborating a model that presented a precise and exact convergence between general balance stage and maximum welfare, Pareto substantiated mathematically the hypothesis of Smith’s invisible hand, which states that economic agents, searching, independently, for benefits, reach, not intentionally, society’s maximum welfare.

dynamic; regarding actions, *symmetric* or *asymmetric*; regarding moves, *sequential* or *simultaneous*; regarding information, *perfect* or *imperfect*; regarding availability, *perfect* or *imperfect*; regarding game balance conditions, *pure strategy* or *mixed*; regarding influence on decision making process, *believes* and *desire of those involved*; regarding gameplay, *determined* or *undetermined*; and, finally, regarding the quantity in *players* and the *number of strategies*. These characteristics integrality can conduct to a better evaluation of transboundary environmental damages.

Thus, the stimulation of each State involved in an accident is, respectively, the polluter searches for its non-liability and the affected searches for the polluter's liability, since the costs can be transferred, in the final analyzes, to the State affected (ELTZ, 2012, p. 44).

Based on polluter pay principle, costs related to measures to prevent and fight against pollution impose damages compensatory and mitigation actions. For example, social costs, which have to be comprised by economic activities, considering goods and services prices, which are lower, when compared to the accident costs (damage value, risks dispersion and management), second Hand Test.¹⁸

In front of these costs, we can infer that a State decision would be prevention. However, States decide not to cooperate, due to the fact that they believe that coercion is, in fact, other more powerful States' intervention. This way, States will always count with the possibility of not being liable, since most international norms do not comprise binding norms of possible accountability.

FINAL CONSIDERATIONS

This research analyzed theoretical presuppositions related to transboundary environmental damages, which go beyond border policies among nations, making state sovereignty relativism necessary, in order to protect Earth ecosystem. This study allowed a better comprehension of decision making process, using strategic mechanisms of theory of games and international environmental law and norms.

The promotion of the idea that nature is inexhaustible, free and everlasting was later replaced by the awareness that it is rare, increasingly expensive and that it has to be protected. The right to a healthy environment is inherent to all living beings and, therefore, environment protection has to be performed through the rational usage of natural resources when preventing and/or fighting against all type of intern and transboundary damages.

Nevertheless, environmental degradation is the most aggressive factor that contributes to reduce length

¹⁸ For Mackaay and Rousseay (2015, p. 375), Hand Test referred to Learned Hand judge case, which created a negligence analysis test in North-American Law field that has been used in pairs by other nations built on Germanic-Roman Legal System. It corresponds to an economic view aiming prevention, and enabling relearn the concept of guilty, that is, magistrates define cautious

and quality of life. Humanity has the right to live in a healthy, clean world, but, at the same time, has the duty of ensuring environment preservation.

In this line of thought, UN global concern regarding States' right to use their natural resources with responsibility was stressed out in Stockholm Convention, followed by Earth Summit and Johannesburg Summit, where they reaffirmed the planet sustainable development.

In this bias, the general comprehension about environment damages have become more sophisticated, since nations comprehend the complex environmental processes and the relations that go far beyond their boundaries. However, international environment norms (treaties) are still subjected to States' interaction structure, inside a combination of two situations: cooperation or no cooperation.

When facing transboundary environmental damages, it is clear that the most balanced choice occurs when States agree with a common sustainable development and, thus, harness the benefits. Hence, the best strategy (which brings better benefits) is the one that leave antagonistic positions behind and agrees with a more neutral form, avoiding affecting each other.

The solution for transboundary damages runs through States' efforts in order to dialogue about the issue. Countries have to understand that several consequences caused by their actions can impact negatively on environment and, thus, States have to base their cooperative game stressed by the negotiation process in favor of mutual benefits in different situations.

DANO AMBIENTAL TRANSFRONTEIRIÇO: UMA ANÁLISE DA RESPONSABILIDADE CIVIL A PARTIR DO DIREITO AMBIENTAL INTERNACIONAL E DA TEORIA DOS JOGOS

Resumo

O objetivo deste estudo é analisar a responsabilidade civil pelo dano ambiental transfronteiriço (ou fronteiriço) na relação decisória dos causadores utilizando o instrumental analítico da teoria dos jogos e normas internacionais de direito ambiental (em geral, tratados). Defende-se uma cooperação internacional dos Estados soberanos relativa à concretização global de um meio ambiente sadio e equilibrado. Ao relacionar o dano ambiental com o direito ambiental internacional e a teoria dos jogos, o texto centra-se na delimitação estratégica que os Estados tomarão para se resguardar ou não de possíveis prejuízos em torno do princípio do poluidor-pagador.

Palavras-chave: Dano ambiental transfronteiriço; Responsabilidade civil; Direito ambiental internacional; Teoria dos jogos; Princípio do poluidor-pagador.

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