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THE ECOLOGICAL DAMAGES RECOVERY UNDER THE BRAZILIAN LAW

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ABSTRACT

This paper analyzes the ecological damages recovery under the Brazilian Law from a critical point of view, by studying the peculiarities and differences between ecological damages and environmental damages, as well as discussing how the aspect of recovery of damages is addressed in the comparative law. The methodology was based on a review of the national and foreign literature and legislation, as well as an analysis of court precedents on this matter. The main objectives of the present paper are the demystification and the critical assessment of the romantic vision related to the natural recovery, understood as the return of the environment to the status quo before the damage had occurred. It was verified that this recovery must, as a matter of fact, seek an approximation to the status of the environment prior to the damage, but not its complete or pure recovery, since this scenario would be an impossible object, mainly due to the lack of reliable and updated databases on the aspects of environmental quality that can be used as a parameter of comparison between the environment before the damage and the environment after the damage. It was concluded that the pecuniary indemnification is a secondary obligation, that is only can be imposed when it is not possible to recover the ecological damages.

Keywords: Recovery of environmental damages; Ecological Damage; Environmental Damage.

A RECUPERAÇÃO DE DANOS ECOLÓGICOS NO DIREITO BRASILEIRO

RESUMO

Este artigo analisa a questão da recuperação de danos ecológicos no Direito Brasileiro do ponto de vista crítico, ao trazer as nuances e diferenças entre os danos ecológicos e os danos ambientais, além de discutir como a questão da recuperação dos danos é abordada no direito comparado. A metodologia adotada se baseou em diferentes revisões como a da literatura, da legislação nacional e estrangeira e a revisão da análise de precedentes judiciais acerca do tema. Os objetivos principais do presente trabalho são a desmistificação e a avaliação crítica da visão romântica relacionada à recuperação natural, entendida como o retorno do meio ambiente ao status quo ante ao dano. Constatou-se que a referida recuperação deve, em verdade, buscar uma aproximação ao status do meio ambiente anteriormente ao dano, mas não a sua recuperação completa ou pura, já que isso se configuraria como um objetivo impossível, sobretudo pela inexistência de bancos de dados confiáveis e atualizados sobre os aspectos de qualidade ambiental que possam ser utilizados como parâmetro de comparação entre os aspectos do ambiente antes do dano e após o dano. Conclui-se que a indenização pecuniária é uma obrigação secundária, sendo devida apenas quando não for possível recuperar os danos ecológicos.

***Palavras-chave**: Recuperação de danos ecológicos; Dano Ecológico; Dano Ambiental.*

"It is not possible to return to a harmonious state of nature, in the sense that turning back would imply a total regression, that is, a return to animal life"

Karl Popper

INTRODUCTION

The purpose of this article is to carry out an examination on the recovery of damages to the environment, which is one of the most relevant themes of Environmental Law, even though it has not received due attention from the doctrine. In fact, most of the available literature is dedicated to the study of the system of environmental liability, be it administrative, civil or criminal, not deepening in the area of repair of environmental injuries, with a strong tendency to the confusion of repair of damages with the pecuniary indemnity. In the same way, a doctrinal and jurisprudential tendency that confronts the issue, the introduction of the concept of collective moral damage, is indisputably a tacit acknowledgment of the inability to deal with the crucial problem of repairing environmental damage, with few works being designed.

The environment harmed as a result of anthropic activities must be recovered by those who have caused the injury, as is the result of the simple application of the principle of responsibility (ANTUNES, 2016, p. 55). However, the Environmental Remediation is ordinarily more complex than the compensation for damages to other types of goods. Firstly, it should be noted that a large part of environmental goods is irreplaceable goods, that is, they can not be replaced by others of equal status. Take the example of the extinction of a species or the destruction of a remarkable landscape, goods out of the trade and therefore difficult to monetize. It should be noted that many environmental goods are classified as out of business and, at the same time, maintain a strong affective bond with the community. Thus, in many cases, in the face of economic difficulties, there is an inclination of the doctrine and even of the jurisprudence to establish a pecuniary indemnity for the damages caused to the environment. This Article, however, will demonstrate that this solution is not compatible with the specific nature of the environmental damage. To do this, it would be necessary to establish a clear demarcation of what is meant by environmental damage and what its modalities under Brazilian law are.

Methodologically, the article will establish the necessary distinction between (i) environmental damage and (ii) ecological damage. This preliminary question is fundamental since Brazilian law uses the broad concept of environmental damage, which includes damages to economic activities, public health, property, and persons, as well as damages to natural resources considered in themselves, or ecosystems. The article intends to demonstrate that there is a difference between environmental damages and ecological damages and that, specifically in Brazil, such a distinction has not been considered, which has led to an inadequate understanding of the peculiar characteristics to be observed in the subject of ecological damage repair. The distinction will be made on the basis of existing legal doctrine, examining it in its national and international manifestations, seeking to demonstrate that the separation between (i) environmental damage and (ii) ecological damage is essential for the identification and definition of appropriate recovery measures. Obviously, in the context of the article, the issue of economic valuation of natural assets and ecosystems will occupy a prominent position, which is why it will merit compatible treatment in the article.

Once the conceptual definitions of environmental damage and ecological damage have been established, a study will be made of the specific characteristics of the recovery of ecological damage, in particular as regards its limits and objectives. As will be demonstrated, ecological damage recovery is based on a technical solution and is not to be confused with absolute reprisals to the *status quo ante*. Such a demonstration will be promoted on the basis of existing legislation and case law.

1 ENVIRONMENTAL AND ECOLOGICAL DAMAGES

In order to move towards a proper understanding of the intriguing question of recovering from damages to the environment, it is necessary to identify the legal mechanisms capable of making it viable. The legal protection of the environment in Brazil is done through Environmental Law and not Ecological Law (ANTUNES, 2016); this option was made due to the fact that in the concept of the environment - as adopted in Brazil - elements such as economic, social and ecological activity are included. Thus, Environmental Law contains the "ecological right", which, in turn, would be the right focused exclusively on nature protection, which, as we know, is not the hypothesis of the Brazilian legal order. It is, therefore,

necessary to establish the proper fields of environmental damage and ecological damage so that the relevant issue of recovery can be dealt with from a legal point of view. José de Sousa Cunhal SENDIM (1998, p. 70) points out that the expression "damages caused to the environment" is a characteristic of Brazilian law, and it is therefore necessary to note how other orders deal with the problem.

The National Environmental Policy (Federal Law No. 6. 938/1981 - "PNMA"), although it does not have a normative definition of environmental or ecological damage, provides an indication for the establishment of the respective concepts, when defining (i) degradation of environmental quality and (ii) pollution, concepts that, combined, can lead to an understanding of the concept of environmental (ecological) harm.

The *degradation* of environmental quality is the adverse change in the characteristics of the "environment"; in turn, *pollution* is the degradation of environmental quality that is "resultant" from activities that, directly or indirectly, (i) impair the health, safety, and well-being of the population, (ii) create adverse conditions for social activities (iii) adversely affect the biota, (iv) affect the aesthetic or sanitary conditions of the environment, or (v) throw materials or energy in disagreement with established environmental standards. In its regulatory body, the National Council for the Environment ("CONAMA"), in its Resolution No. 01/1986, established the concept of environmental impact that, to a certain extent, reproduces the concept of environmental degradation, since it is "any change" of the physical, chemical and biological properties of the environment - in this case the physical environment - that has been caused by any form of matter or energy resulting from human activities, affecting, directly or indirectly, (i) health, safety and good (ii) social and economic activities, (iii) biota, (iv) aesthetic and sanitary conditions of the environment, or (v) the quality of environmental resources.

Pollution, however, is a polysemous word that can be legally relevant or irrelevant. In Brazilian law, it is possible to identify at least three types of pollution (i) the one in the strict sense, (ii) environmental damage and (iii) environmental crime. (ANTUNES, 2015, p. 125).

It is important to note that in some cases pollution - in the sense of disagreement with pre-set environmental standards - is allowed, for example in the case of the so-called "mixing zone" defined by CONAMA Resolution No. 430/2011 as "The region of the receiving body, estimated on the basis of theoretical models accepted by the competent environmental

agency, which extends from the effluent launch point and is delimited by the surface on which the mixture equilibrium between the physical and chemical parameters is reached, as well as the biological balance of the effluent and that of the receiving body, being specific to each parameter."

As seen above, Brazilian standards clearly identify two types of "environmental damage". The first is a reflex damage, that is, the damage that does not reach the natural resources themselves, but which result reflexively from natural resource damage. As an example, a community that has suffered an interruption in the water supply due to serious pollution in the water sources. Lack of water and its economic and social consequences are directly derived from pollution. The second is the damage to the environment itself, taking care, in this case, of a pure environmental damage.

As regards recovery and quantification, the paths will be quite diverse. For methodological reasons, the concept of ecological damage is adopted for damages caused specifically to the environment and natural resources. The conceptual distinction, now handcuffed, is justified, since the advantages for an adequate understanding of the particularities and characteristics of each one of the modalities are evident, facilitating the understanding of the object to be studied, since, as already registered, there is "an excruciating confusion" (ROMI, 2010, p. 148) between environmental damage and ecological damage.

In fact, it is known that the environment is composed of goods of different classes, domestic regimes and many other elements that need to be clearly identified and defined so that one can be sure about the kind of damage in question. For example, avoiding "excruciating confusion" can not combine health damage with that which affects the aesthetic conditions of the environment, or the destruction of mangroves or fountains. (ANTUNES, 2015, p. 126).

An excellent clarification of the concepts of environmental damage and ecological damage was made by the Portuguese Southern Administrative Court[1], subsequently confirmed by the Superior Administrative Court[2]. The Portuguese administrative courts consider that *ecological damage* consists of "intense injuries" produced to the ecological system, irrespective of violation of individual rights, and is

1 Central Administrative Court South 2nd Judgment, 05849/10. Date 07/02/2013, Rapporteur Paulo P ereira Gouveia, available at: <https://goo.gl/RmbtMV>. Accessed on: 02 Apr. 2017

2 Superior Administrative Tribunal, 1st Section, 0978/13, Date 20/02/2014, Rapporteur São Pedro, available at: <https://goo.gl/4FNxcR>. Accessed on: 02 Apr. 2017

therefore "an injury caused to a natural resource, which could cause a significant balance of the legal environment or natural heritage and their interaction ". *Environmental damage*, in turn, is caused to the environment and generates "repercussions in the patrimonial sphere of an individual". Fernando Reis CONDESSO (2014, page 211), when analyzing decisions of the Portuguese administrative courts, emphasizes the fact that *ecological damage* does not include the offense of diffuse, collective or individual interests, which, according to the Court, resemble violations of citizens' subjective rights, which is why it is not justified to treat them together with damage to natural assets.

The *environmental damage*, thus, is the repercussion of damage caused to natural assets in the particular sphere of the citizen or legal entity. In this way, as it is also a violation of subjective rights, compensation will be payable in respect of the subjective rights of third parties.

2 ECONOMIC VALUE OF ENVIRONMENTAL RESOURCE (ECOLOGICAL)

Establishing a price or economic value for goods to which "invaluable" value is attributed is culturally repugnant. However, daily prices and values are attributed to priceless goods such as human life. Besides, such figures may vary depending on the legal status of the deceased. Thus, if a retired citizen died under social security, the death pension due to his relatives would be of a value; if not retired, the value would be different[3].

The entire insurance industry is based on the setting of indemnity values which, in practice, is the definition of values determined for goods considered to be "invaluable". In relation to the environment, there is no difference. The question has, of course, a strong moral content that is related to how much should be spent to protect the environment (ACKERMAN; HEINZERLING, 2004, p. 9). The fact is that not only the protection of the environment has a cost, but also the recovery of the degraded environment. Based on this premise, it is essential to establish criteria that can serve as instruments to ensure that such costs are adequately identified.

The attribution of economic value to natural resources is a task of major importance since it is through this that we can decide recovery

3 For more information, check: <https://goo.gl/q6dAhj>. Accessed on: 08 Apr. 2017

measures or even monetary damages due to damage to the environment. In the specific case of Brazil, it cannot be forgotten that the environment is, by virtue of law, considered as public patrimony (PNMA, article 2, item I). In addition, environmental control bodies, in the use of their attributions, often do not recompose the environment damaged by any harmful action, and therefore need to have pecuniary values capable of offering some direction for administrative action. Thus, the Economic Value of Environmental Resources ("VERA") is the subject of a formulation that includes (i) the Value of Use ("VU") and (ii) the Non-Use Value equation (MOTTA, 2004, p. 94):

$$VERA = (VUD + VUI + VO) + VE$$

According to Ronaldo Seroa da MOTTA, the economic value of environmental resources "is not observable" (2004, p. 93), because there is no price system that reflects its opportunity cost, and its "consumption" is through use and non-use. The use and non-use are divided into (i) Direct Use Value ("VUD"), which is attributed to an environmental resource for its direct use, which may be by extraction, visitation or other direct production or consumption ; (ii) Indirect Use Value ("VUI"), that attributed to an environmental resource when the benefit of its use derives from its own ecological functions; (iii) Option Value ("VO"), the one attributed to the conservation of resources that may be threatened, ensuring direct and indirect uses in the near future. In turn, the Non-Use Value, Liability or Existence Value ("VE") is that which is dissociated from use, in accordance with moral, cultural, ethical or other conceptions that imply in its non-use, regardless of its value to society or individuals.

In sum, José de Sousa Cunhal SENDIN (1998, p. 87) identifies three classes of value (i) the current *use value*, that which consumers attribute to the (current) use of an environmental resource - ie, value of the environment as a potential benefit; and (ii) the *option value* - ie, the value of the environment as a potential benefit; and (iii) existence *value* - ie, the value that people attribute to the existence of a resource, regardless of its use *on the ground*.

Of course, there are other formulas and methodologies (CARVALHO, 2008) that can be used to assess ecological damages. In the specific case of oil spills in water resources, the Environmental Company

of the State of São Paulo (CETESB) developed a formula that takes into account the following factors: (i) spilled volume, (ii) degree of vulnerability of the affected area, (iii) toxicity of the product, (iv) persistence of the product in the environment and (v) mortality of organisms. These factors are grouped into a formula, divided into levels, with a given weight assigned to each level, according to the intensity of the risk or damage generated, varying from 0 to 0. 5. The formulation can be summarized in the following equation:

Value ($) = $10^{(4.5 + x)}$
Where X is the sum of the weights assigned according to the severity of the damaging event.

Considering that natural restoration is not always possible, the pecuniary valuation of the injured natural environment has the relevant role of contributing to (i) financially making some form of compensation possible, to make reparation certain, when appropriate (LEITE and ALMEIDA, 2005, p. 81).

2. 1 Economic value of environmental goods in positive law

Since its original wording, PNMA has already admitted the possibility of economic valuation of natural resources, since in its article 4, item VII, the possibility of imposing "to the user, the contribution for the use of environmental resources for economic purposes. " However, such a contribution has never been regulated.

Subsequently, the National Water Resources Policy (Federal Law No. 9. 433/1997 or "PNRH") expressly recognized that "water is a limited natural resource endowed with economic value" and, as a consequence, established as one of its main instruments (i) to recognize water as an economic good and give the user an indication of its real value, (ii) to encourage the rationalization of water use, and (iii) to obtain financial resources for the use of water resources. financing of the programs and interventions contemplated in the water resources plans.

The environmental compensation ("CA") provided for in the Law of the National System of Conservation Units (Federal Law 9,985/2000

or "SNUC") is due in cases of environmental licensing of projects of significant environmental impact and, based on the study of environmental impact, generates for the entrepreneur the obligation to support the implementation and maintenance of the conservation unit of the Integral Protection Group. The legislator arbitrated not less than half a percent of the project costs as a pecuniary equivalent of the ecological damage produced. The definition of value due to environmental compensation, in accordance with the provisions of Federal Decree No. 4,340/2002, is made by applying a formula that has as fundamental parameters the so-called degree of impact ("GI") that should be calculated according to a complex formula, brought by Federal Decree 6. 848/2009, and the reference value ("VR"). Thus, the formula is:

$$CA = VR \times GI$$

VR = sum of the investments necessary for the implementation of the project, not including the investments related to the plans, projects, and programs required in the environmental licensing procedure to mitigate the impacts caused by the project, as well as the costs and costs related to the financing of the project. including those relating to guarantees, and the costs of personal and real insurance policies and premiums;

GI = Degree of Impact in ecosystems, being able to reach values from 0 to 0. 5%.

Also in the National Solid Waste Policy (Federal Law 12305/2010 "PNRS") there is a strong recognition of the economic value of the environment, establishing that solid wastes are economically important, since one of its most relevant guidelines is "recognition of reusable and recyclable solid waste as an economic good and of social value, which generates labor and income" (article 6, subsection VIII). Of course, when the waste is valued, its irregular disposal in the environment is reduced, reducing the environmental costs of society.

2. 1. 1 Judicial Power and Ecological Damage Assessment

The calculation of pecuniary values for ecological goods, far from

being a purely theoretical question, is a matter of great practical importance. In Brazil, there has been an increasing number of legal decisions on the subject. And, as a rule, such decisions have been recognizing the difficulties relating to the valuation of natural resources, adopting pragmatic and case by case solutions. These decisions are based on the assumption that "*there is no legal provision for the valuation of damages to natural resources, and valuation has a great subjective influence."* (Federal Regional Court of the 4th Region, Civil Appeal, Case 0004182-74. 2001. 404. 7201, 4th Panel, Rapporteur Luís Alberto D`Azevedo Aurvalle).

The recognition of the absence of legal regulations - with clear exception for the AC - and the great subjective influence, has led the courts, especially the Court of Justice of São Paulo and the Federal Regional Court of the 3rd Region ("TRF-3") to the use of the methodology developed by CETESB, even if such methodology does not consist of legal or administrative rule; however, as it should be, it is applied topically and casuistically.

The Court of Justice of São Paulo ("TJSP") does not adopt a homogeneous position, but takes into account the peculiarities *of "Methodology for assessing the environmental damage"; however, a different method must be used because it is considered the most suitable for indemnification purposes."* (TJSP, 2007981-95. 2013. 8. 26. 0000, Rapporteur: Ruy Alberto Leme Cavalheiro; District: Ribeirão Bonito; Organ judge: 1st Hall Reserved for the Environment; Date of Judgment: 04/12/2014; Date of registration: 12/05/2014). In the reasons for deciding, the rapporteur warned that although the calculation of the indemnity *quantum* is based on the methodology of the Secretariat of State for Environment, this methodology is not

> the most adequate according to the consolidated understanding in this House. The damage, although certain, is incalculable, and it is practically impossible to limit the extent of the damage caused by the burning. What has been thrown into the air, or health problems, and deaths caused by the event, whether humans or animals are not measurable through traditional expertise. (TJSP, 2007981-95. 2013. 8. 26. 0000, Rapporteur: Ruy Alberto Leme Cavalheiro; District: Ribeirão Bonito; Organ judge: 1st Hall Reserved for the Environment; Date of Judgment: 04/12/2014; Date of registration: 12/05/2014)

The methodology that has prevailed, whether administrative or legal, is adopted by CETESB, which, however, is a mere *proposal* of a methodology to be applied, especially in cases of oil spills at sea. The Federal Regional Court of the 3rd Region, on several occasions, has decided concrete cases based on the methodology of valuation of ecological damages used by the environmental agency of São Paulo.

> The payment of compensation for damages caused to the environment is sustained, [...] calculated in liquidation by arbitration, corresponding to the minimum value of the "Proposed Criteria for Monetary Valuation of Damage Caused by Spills of Petroleum or its Derivatives in the Marine Environment", elaborated by CETESB; and reverted to the Reparation Fund for Injured Diffuse Rights (Article 13 of Law No. 7. 347/85) "(TRF 3rd Region, 6th T, AC-1949578-0006782-42. 2011. 4. 03. 6103, Federal Judge Johonsom di Salvo, e-DJF3 Judicial 1:19/11/2015)

It is interesting to note that TRF - 3 has been using the equity criteria to define the monetary value equivalent to ecological damages.

> The court of origin condemned the defendants to pay R$40,000. 00 (forty thousand reais) as compensation for environmental damage. The overdue vote, in turn, increased the amount to R$ 158,489. 32, *considered disproportionate to repair the environmental damages in the concrete case, to the ground that the area of the accident was already at an advanced stage of degradation due to the port activity itself*, so that the winning vote established the indemnity in R$ 80,000. 00 (eighty thousand reais). - If the law does not provide criteria for fixing the amount of compensation for environmental damage, there is no obstacle to the application of the criteria set out in the CETESB methodology, obviously taking into account the particularities of the case in question and observing the principles of reasonableness and proportionality. Notwithstanding the criticisms made of it, they do not disqualify it as an adequate technical instrument to estimate the monetary quantification of the amount of compensation. - The adoption of the CETESB methodology is also justified by translating a measure that avoids the random imposition of the quantum that can be indemnified, since it acts as a mathematical standard for the monetary valuation of damages caused by oil spills or their derivatives at sea, since its five relevant aspects (volume, area vulnerability, product toxicity, product persistence and organism mortality) were precisely observed, and divided into levels, according to the severity of the risk or damage generated, varying from 0 to 0. 5, and except

> for the need to adjust the assessed value to the peculiarities of the case and meeting the criteria of reasonableness and proportionality to the actual offense to the estuary. Precedents of this court. - As explained in the expired vote, the calculation of the indemnity based on the formula established by CETESB represents a technical-scientific criterion that incorporates reasonableness and proportionality, so that it exempts and must prevail over any other valuation."(TRF 3rd Region, SECOND SECTION, EI-1331362 - 0006757-75. 2001. 4. 03. 6104, Judge Convoked Leila Paiva, e-DJF3 Judicial 1: 23/06/2016).

3 RECOVERY OF ECOLOGICAL DAMAGE

The second half of the twentieth century attributed significant value to the environment and soon gave rise to Environmental Law, which has an increasingly significant role in the legal system. In a few years, the environmental issue assumed a constitutional *status* in several countries, including Brazil. Due to this circumstance, the recovery of damages caused to the natural environment gained unheard of *status* and relevance.

3. 1 The recovery of ecological damage as a constitutional obligation

Responsibility for damages to the environment and its consequent recovery, as is known in Brazil, is directly related to the Constitution of the Federative Republic of Brazil ("CRFB"), more precisely in Article 225, §3. However, under the previous constitutional regime, the ordinary legislation already had on the subject (article 14, §1, of the PNMA).

The constitutionalization of the protection of the environment adopted by Brazil in 1988 represented the country's adherence to a trend characteristic of modern constitutions, such as the constitutions of Argentina (Article 41), Colombia (Article 79), France (Constitutional Law - Environment Charter, Article 4), Spain (Article 45), Paraguay (Article 7) and Portugal (Article 66)[4], for example. As a result of the environmental protection established in such constitutions, there is a system of damage repairing to the environment that is based basically on the natural recomposition of the damaged environment, and the pecuniary indemnity is a hypothesis only foreseen in cases of impossibility of natural recovery.

4 For access to the full Constitutions, see: <https://www.constituteproject.org/>. Accessed on: 14 Apr. 2017

However, such an understanding is not easily accepted, since the high emotional load involved in environmental protection issues tends to see as mandatory the pecuniary indemnity that, in practice, would have the function of one *more penalty* to be imposed on the causer of damages to the environment. However, it should be noted with Carla Amado Gomes (2014) that this is perhaps one of the "misconceptions" of environmental law because it is excessively focused on *ex post facto* repressive behavior and very little committed to prevention. Thus, according to the author, "granting relief to the Institute of civil liability may seem counterproductive. " (GOMES, 2014, p. 239)

As will be shown, the recomposition of environmental damage and natural recovery, as dealt with in the Constitution, are not to be confused with the return of the environment to a mythical state of natural purity existing independently of the human presence which, as we all know, never existed. It is necessary to make it very clear that it is a "lovely fantasy" to think of ecosystems without human presence. (MORAN, 2011, p. 9)

3. 2 The recovery from ecological damage in infra-constitutional law

Once the constitutional standards have been explained, the issue will be analyzed from the point of view of the infra-constitutional legislation.

3. 2. 1 Brazilian law

The recovery from ecological damages and the recomposition of degraded biota, under Brazilian positive law, are carried out under the supervision of the environmental control agencies, according to their respective spheres of competence. Thus, the natural recovery of ecological damage will be what the environmental control body says it is. This is a finding that should not be surprising, as it follows from a logical interpretation of provisions expressly provided for in the CRFB. In this case, Article 225 § 2 of the CRFB, which literally determines, in relation to mining activity, the obligation to recover "degraded environment, according to a technical solution required by the competent public form of the law. "Although the mention is explicitly referring to the case of mining, the fact is that the model is applicable to any and all ecological damage.

Thus, the ecological recovery is submitted to an evaluation of

the environmental control body that determines its limits. It takes care of a measure of proportionality between the level of recomposition of the affected biota and the sensible question of the costs of the reparatory activities of the environment. In addition, it is necessary to establish what is the optimal limit of recovery, because effectively the natural recovery measures must, of necessity, leave room for nature, after a planned and appropriate stimulus to the concrete case - the measures promoted in the recovery process -, follow your course regardless of human action. Natural goods cannot be replaced by other goods, for a dead bird will not return to life; Therefore, what is sought is an equivalent, as close as possible to what was lost.

The Brazilian law, unfortunately, did not give the subject the necessary relevance, being Franciscan on the matter dealing with very few rules dedicated to the matter - most of them are mere administrative regulations. As one knows, PNMA has as one of its objectives the "recovery of environmental quality" (Article 2), and "recovery of degraded areas" (Article 2, VIII) is one of its fundamental vectors.

Degraded areas under the PNMA are those in which an "adverse change in the characteristics of the environment" has occurred (Article 3, II). However, the PNMA does not give any indication of the meaning to be attributed to the recovery of degraded areas, being, in particular, an open standard. In order to proceed, it is considered convenient to bring to light the concept of environmental degradation, which is:

> […] the alteration of the characteristics of a given ecosystem through the action of agents external to it. This process is conceptually characterized by the loss or diminution of matter, form, composition, energy, and functions of a natural system by means of anthropic actions (SILVA et al, 1999, p. 73).

Conceptually, environmental restoration is the "artificial process of recomposition of certain degraded areas to their original natural state" (SILVA et al, 1999, p. 195), with a caveat about the impossibility of returning to the past.

Law No. 9,605 of February 12, 1998 ("Environmental Crimes Law") uses the terms (i) composition, (ii) recovery and (iii) repair when it refers to ecological damage and degraded areas. It is important to emphasize that the standard provides that reparation may be (i) spontaneous or (ii) forced, with diverse legal consequences. In the criminal

field, the spontaneous reparation of damage has as one of its most relevant consequences the attenuation of the sentence imposed on the defendant (article 14, II). It should be noted, however, that the standard admits the "significant limitation of environmental degradation", which has been understood, from the point of view of the application of criminal law, as "partial reparation of the damage caused" (GOMES; MACIEL, 2015, p. 58).

Article 27 of the Environmental Crimes Act allows for a "prior composition of damages", a concept of a procedural nature, which implies the conclusion of an agreement between the defendant and the accusation for damages, which should be done according to the plan approved by the environmental authority; that is, the public entity, which has been assigned to issues related to the quality of the environment and its recovery, notably the person responsible for environmental licensing, as can be seen from the combination of article 10 of PNMA with articles 2, I, art. 7th, subsection XIV, art. 8, item XIV and article 9, item XIV of Complementary Law nº 140, of December 8, 2011. Here again, the idea of recomposing the damaged environment is the most important one, because "the first concern was the restoration of the damaged environment" (GOMES; MACIEL, 2015, p. 97). There is, however, a miscalculation of ecological damage in Article 20 of the Environmental Crimes Law, which stipulates that the judgment should - whenever possible - stipulate the "minimum value" equivalent to the damage suffered by the environment (ecological damage).

As can be seen, although present several mentions of recovery and environmental restoration, the national legal system lacked normative definitions for the terms, which came to be overcome by SNUG Act which in its Article 2, items XIII and XIV (i) recovery of the *"* restoration of a degraded ecosystem or wild population to a non-degraded condition which may be different from its original condition" and (ii) the *"*restoration of a degraded ecosystem or wild population as close as possible to its original condition". It is seen, therefore, that the recovery of ecological damage, unlike what one might think, does not correspond to an abstract restitution of the damaged natural environment to an ideal original state on which, in most cases, there is not even one information. This is, as we can see, a recovery until a certain stage, considered technically adequate by the environmental control body.

In particular, it is necessary to return to paragraph 2 of article 225 of the CRFB, which expressly - repeats - establishes that, in relation to

mining activity, there is an obligation to recover the "degraded environment, according to technical solution required by the competent public body, in accordance with the law. "In this way, environmental recovery is what the environmental body considers as such, according to clear constitutional authorization. In fact, several state constitutions, such as the Constitutional Texts of the states of Minas Gerais (article 214) and São Paulo (article 190) adopt the same conception. However, the environmental control body is not free to consider a degraded area as being reclaimed and is limited in its discretion by the concrete results produced by the implementation of a certain technical recovery project. Likewise, the environmental control body cannot, at its discretion, define recovery programs that do not keep an adequate proportion, either with the damage caused or with the capacity of payment of its causer.

3. 2. 1. 1 Program for the Recovery of Degraded Areas - PRAD

According to what has already been exhaustively seen in this article, the complete restoration of the environment to the conditions prior to the occurrence of the damage that is sought to recover is a purely rhetorical - or, symbolic - issue, since this is not the or administrative practice. Recovery is a technical solution defined by the environmental control agency, known as the Recovery Plan for Degraded Areas (PRAD). The different environmental control bodies have their own rules for defining the procedure to be adopted by the causer of the damage - or their successors - for the recovery of the damaged areas. The Brazilian Institute of Environment and Renewable Resources (Ibama) disciplined the subject by the Normative Instruction IBAMA nº 04, of April 13, 2011 (IN nº 04/2011). It is important to note that IN No. 04/2011 pragmatically identifies two categories of recoverable areas, (i) degraded areas and (ii) altered or disturbed areas. The degraded area is that "unable to return to a natural trajectory, to an ecosystem that resembles a previously known state, or to another state that could be expected"; already the altered or disturbed area is one that "after the impact, still maintains means of biotic regeneration, that is, it has natural regeneration capacity".

The Superior Court of Justice (STJ) has, on several occasions, decided matters relating to PRAD and its role in recovering ecological damage. The court has understood that the recomposition to the status *quo ante evaluation* should be done "as far as possible, the *status quo ante* of

the delimited areas" (STJ, Resp 138 208/PE, Rapporteur Minister Herman Benjamin, 2nd Class, DJE 09/12/2016). The relevance of PRAD is such that it is considered a limiting factor of administrative discretion, especially when it comes to reducing environmental fines:

> [...] the reduction of the fine in cases where there is evidence that the competent administrative authority verified full compliance with the PRAD and that the recovery was due to actions were taken by the violator and not due to other factors . . . {0}4. {/0}{1} {/1} In this context, the correct judgment to maintain the reduction of the fine, given the integral fulfillment of the obligations for the repair of damage attested by FATMA, as found by the court a *quo. (STJ, REsp 124. 8649/SC, 2nd Panel, Minister Mauro Campbell, DJe 24/08/2011).*

In a discussion regarding compliance with the PRAD and the concomitant incidence of pecuniary damages due to ecological damage, the 2nd Panel of the STJ understood that:

> The Superior Court of Justice has expressed the understanding that the actions of obligation to do can be cumulated with the indemnities; and that not always the recomposition of the degraded area or the reorganization of the damage provoked refutes the need for indemnification. However, this understanding does not imply the conclusion that compensation will always be due because when it is possible to complete restoration without there being any remaining or reflex damage, there is no mention of compensation. [...](STJ, REsp 1382999/SC, 2nd Panel, Rapporteur Minister Humberto Martins, Dje September 18, 2014).

3. 2. 2 Foreign Law

At this point, it is important to demonstrate that, in terms of legislation, several countries adopt standards similar to those of Brazil. In Argentina, National Law No. 25,675, of November 27, 2002, focused on the protection of the environment and equivalent to the Brazilian PNMA, establishes, in its article 28, objective liability for environmental damage, demanding the doer to restore the environment to its "previous state" to the production of the damage, and compensation is due in the event that the recomposition is not "technically feasible".

In the same sense, the Chilean legislation that, in Law No.

19,300 of March 9, 1994, with a new wording given on June 1, 2016, in its article 53, only admits the reparation action of environmental damages in the hypotheses in that the cause of the damage has not obeyed the directives of the environmental control body for the recomposition of the injured environment. Likewise, in Peru, Law No. 28. 611, General Law on the Environment, establishes the "inexcusable" obligation to restore, rehabilitate or repair environmental damage and, in cases where it is impossible to do so, compensate them.

In the European Union, compensation for environmental damage is made in three basic forms according to the rules contained in Directive 2004/35/EC, namely: (i) primary, (ii) complementary and (iii) compensatory. Primary repair aims at restoring natural resources to their initial or "approximate" state. The complement seeks to ensure a level of natural resources and/or services, albeit in another location, similar to what would have been provided if the site of damage had returned to its initial state. The offsetting seeks to "compensate" for the transitory loss of natural resources and natural services, while recovery does not occur. It is characterized by a series of additional natural habitat improvements, protected species, water, either in the damaged site or in an alternative location.

Portugal incorporated the rules of the Directive into its domestic law by Decree No. 147/2008, of 29 July. Recovery measures, in accordance with Article 15, shall be implemented by the person responsible for the damage. It shall, regardless of notification by the environmental authority, take all measures to control the situation and, as far as possible, "control, contain, dispose of or manage the relevant contaminants and any other harmful factors. " After the first phase of dealing with the damage, the person responsible will initiate the relevant repair measures. Of course, the environmental control body has a wide discretion to investigate the facts, to determine additional reparation measures that it deems appropriate, and even to perform reparatory acts at the expense of the person causing the damage.

In relation to damage to water, protected natural species and habitats, the standard establishes three modalities to be adopted, namely: (i) primary repair: any repair measure that restores the damaged natural resources and/or services to the initial state, or brings them closer to that state; (ii) supplementary repair: any remedial action taken in relation to natural resources and/or services to compensate for the fact that primary

repair does not result in the full restoration of damaged natural resources and/or services and (iii) Compensatory compensation: any action to compensate transient losses of natural resources and/or services verified from the date of the occurrence of damages until the primary repair has fully reached its effects.

In France, which, like Portugal, have adopted the standards contained in Directive 2004/35/EC, in its Environmental Code, the same range of remedial measures is established. It is seen that the different measures of repair to be adopted are suggested by the person in charge of the recovery of the damage and approved by the environmental authority. Such a suggestion is made through a specific plan that, in Brazil, as seen, is known as PRAD; check Eve Truilhé-MARENGO (2015, p. 248) and Philippe MALINGREY (2016, p. 221).

Therefore, ecological repair is not synonymous with total reversion to the state prior to the injurious fact, as is very clear in normative and legal commands. It can be seen, therefore, that the rules do not determine the repristination of the environment to its original state, even because this could only occur, in theory, with the existence of a database on the state of the environment in a moment before the occurrence of the fact harmful What is sought is an "approximation" to the previous state." (RESP_201301228700, Minister HUMBERTO MARTINS, DJe: 09/18/2014).

It is important to emphasize that natural recovery is a concept that is not confused with full and complete regeneration of the environment. This is so, since, according to the old lesson of Heraclitus of Ephesus, water is not drunk twice in the same river, for life is in constant flux. In fact, François OST (1995, 109) - along with the same lines - demonstrates the logical impossibility of returning to the status *quo ante*, since "nature, like history, never repeats itself; it is only at the level of human perception that the impression of its return is formed. "

The concrete difficulties for the monetary quantification of damages and for the definition of remedial measures have gradually introduced innovative measures such as environmental funds.

4 LEGAL DOCTRINE AND THE RECOVERY FROM ECOLOGICAL DAMAGES

Since the legal frameworks related to the matter have already been pointed out, it is necessary to examine the doctrinal interpretation of the law. As will be seen, the doctrinal voices, almost unanimously, have considered that the repair of ecological damages should be done initially by natural recovery, which consists in the use of techniques and in the monitoring of their effectiveness, in order to allow the damaged pathway, follow an organic recovery path, which should be monitored by the causer of damage, under the supervision of the environmental control body. Such a natural recovery in the national juridical-administrative reality is done primarily by the execution of a PRAD, (cf. IN No. 04/2011), which is prepared by the responsible for the recovery of the degraded area and submitted to the environmental control body, generally responsible for environmental licensing. The recovery of ecological damage cannot be confused with "a modern version of Lex Talionis. "(ANTUNES, 2015, p. 164).

In the same vein, José Rubens Morato LEITE and Patryk de Araújo AYALA (2010, p. 210) argue that it is the best way of repairing environmental damage, that is, the ideal, the use of recovery or recomposition techniques of the property damaged, and also to stop the practices harmful to the environment, in this case. Thus, according to Fabiano Melo Gonçalves de OLIVEIRA (2010, p. 152), the reparation of environmental damages is divided in (i) repair *in nature* and (ii) indemnity, observing the existence of a preference order, which means that the indemnity will only be due in the event of the impossibility of natural recovery. It is not, however, an isolated voice, since, as Danny Monteiro da SILVA (2006, 188) considers, the same content, since natural recovery should only be abandoned if "it is proved technically impossible to obtain the standard prior to the event of the injury. "Even the maximalist doctrine, as is the case with Annelise Monteiro STEIGLEDER (2004, p. 237), understands that the "fundamental option" is the natural restoration of the environment. Specifically, in relation to the indemnification option, Luciana Stocco BETIOL (2010, p. 157) points out that pecuniary compensation should be considered as the last option "in a clear demonstration that the end of the law is to restore the natural environment to its original state, even though

the compensation does not have the power to erase the damage, but only to compensate the victim. " Indeed, as Patricia Faga Iglecias LEMOS (2010, p. 209) reminds us, "concrete reparation of the degraded environment is always preferable to the payment of indemnity. "

The international legal-environmental doctrine, as well as the national one, has a clear option for the natural recovery from ecological damage, as demonstrated by Agathe Van LANG (2011, p. 214) and Eve TRUILHÉ-MARENGO (2015, p. 247). Van Lang also raises the interesting question of the contradiction between the reimbursement of the costs of environmental recovery measures and the establishment of monetary compensation for the recomposition of degradation. According to the author, both are self-excluding. Indeed, as noted by Truilhe-Marengo, Directive 2004/35/EC clearly made the option for the primacy of natural recovery from the damages. Just as a complement, it is worth mentioning the legislative solutions of some countries. In Portuguese Law, the Civil Code, in its article 566, I, expressly establishes that the indemnity in cash will be fixed "whenever natural reconstitution is not possible, does not fully repair the damages or is excessively burdensome for the debtor", confirming, therefore, that proportionality and natural recovery are fundamental elements as limits of natural recovery. The same applies to Article 829, II on demolitions, where the "damage of demolition to the debtor is considerably greater than the damage suffered by the creditor". Likewise has the German Civil Code, § 251 (1), stating that when the restoration is not possible or enough to compensate the lender responsible for the damage should do it for the rest in cash. If natural recovery is only possible with disproportionate expenses, the indemnity in cash should be made (§. 251(2)). The Brazilian Civil Code itself allows, by analogous integration, when it comes to environmental issues, to identify that indemnity in pecunia is a step after the impossibility of complying with the object of the debt (article 947).

5 ENVIRONMENTAL FUNDS

In terms of reparation for damages to diffuse interests - which, as we have already seen, resemble in some measure the violation of subjective rights -, Brazil admits the existence of environmental funds with reparatory objectives (ANTUNES, 2015, p. 203). These funds are at the federal level: (i) Fund for the Defense of Diffuse Rights ("FDD"), (ii)

National Environment Fund ("FNMA") and (iii) Amazon Fund. However, not all funds listed are made up of pecuniary damages due to ecological damage; in fact, although the three funds mentioned have among their different objectives the repair of ecological damages, only one has as a source of compensation the damages resulting from judicial convictions for the practice of ecological damages.

The FDD has its origin in the Public Civil Action Law (Federal Law No. 7. 347/1985), which provides that " [w]ere a conviction in cash, compensation for the damage caused shall revert to a fund", the purpose of which is to "reconstitute of the injured property ". It is perceived that there is a contradiction in the norm since the indemnification is not confused with the hypothesis of reconstitution of the injured property, since the latter is an obligation to make that it is consubstantiated in a PRAD. Currently, the FDD is governed by Decree No. 1,306, dated November 9, 1994. It is important to note that the funds raised by the FDD should be used in activities "related to the nature of the infraction or damage caused", seeking "specific reparation of the damage caused, whenever this is possible", that is, the responsibility of reprising the so-called status quo ante was recognized.

The FNMA was created by Law 7,797 of July 10, 1989, and has no legal relationship to the repair of natural assets, resulting from civil liability. The resources of FNMA are destined to the application in (i) units of conservation; (ii) research and technological development; (iii) environmental education; (iv) forest management and extension; (v) Institutional Development; (vi) Environmental Control and (vii) rational and sustainable economic development of native flora and fauna.

The FA is a fund governed by Decree No. 6,527, dated August 1, 2008, and administered by the National Bank for Economic and Social Development ("BNDES"), basically made up of international donations aimed at protecting the Amazon biome; its resources are destined to (i) management of public forests and protected areas; (ii) environmental control, monitoring, and inspection; (iii) sustainable forest management; (iv) economic activities developed from the sustainable use of vegetation (v) ecological and economic zoning, territorial planning and land regularization; (vi) conservation and sustainable use of biodiversity; and (vii) recovery of deforested areas. Like the FNMA, the FA does not have the characteristic of being a fund made up of indemnities for the recovery of ecological damages.

The FDD had a total collection, in the year 2016, in the order of R$ 775,042,663.00[5], of which judicial convictions related to ecological damages amounted to R$2,716,068.21[6], an inexpressive value in the face of the volume of fund resources. It should be noted that in the same period, the infractions committed in relation to the economic order contributed with R$178,752,647.64 to the FDD. There is no appreciation of the state funds because, in most states, information is not available.

The meager resources collected from the FDD demonstrate that the judicial indemnification model, as seems to be the preferred in Brazil, is largely inefficient.

6 NATURAL RECOVERY AND PROPORTIONALITY

As discussed in this article before, the protection of the environment, in several countries, including Brazil, is a constitutional obligation; therefore, it seems evident that it must be carried out strictly within the constitutional and legal limits. In this way, the actions of the public authority, with a view to recovering environmental damages, are contained within the constitutional limits of any and all administrative action.

As has been widely demonstrated, natural recovery (restoration) is the first measure to be taken for ecological damage assumptions. It is known, however, that it is a measure of an administrative nature - insofar as it is subject to the control of environmental agencies - and, therefore, subject to the constitutional principles governing Public Administration, in the Brazilian case, contemplated in article 37 of the CRFB. Although not an explicit principle, the proportionality of administrative action is a constitutional imperative in the Democratic State of Law.

In the registered office, the proportionality of administrative action is contemplated in the Federal Administrative Procedure Act (Federal Law No. 9. 784/1999), according to article 2, sole paragraph, item VI. In particular, Maria da Glória GARCIA (2015, pp. 34-35) reminds us that an "Environmental State" is not confused with a State that suppresses freedom and Law "in the name of environmental protection". One of the greatest guarantees of non-suppression of freedoms is given by the fact that the Rule of Law, even the so-called "Environmental Rule of Law"

5 More information at: <https://goo.gl/PMC2h5>. Accessed on: 13 Apr. 2017

6 More information at: <https://goo.gl/oviHKa>. Accessed on: 13 Apr. 2017

and its many variables (SARLET and FENSTERSEIFER, 2014, 27), law, in addition to that their actions, repressive or not, are taken proportionally to the actions practiced by the individuals - even when they express illicit acts. Regarding the subject of recovery/repair of ecological damage, there is no difference. In fact, it is the proportional measure that ensures the placing of brakes on the discretionary administrative activity, avoiding that it becomes arbitrary, marking the action of the State that is "interpreter-applicator in the accomplishment of the natural restoration" (SENDIN, 1998, p. 218).

The idea of the prevalence of proportional measures for the adoption of ecological damage recovery procedures is stated by the PNMA itself, as it is explicitly stated in its Article 2 when it establishes the need to reconcile environmental protection with economic development. Therefore, the PRAD itself must be conceived without cost or with excessive costs, otherwise, it will render the natural recovery of the degraded area economically unfeasible, which, as a last consequence, will cause the natural recovery process itself to be paralyzed. Thus, it seems evident that the so-called integral recovery of the environment or unlimited liability for damages to the environment should be taken only in their rhetorical character, since they do not correspond to (i) legal determinations and (ii) much less concrete possibilities, in most cases, since "nature does not repeat itself".

Incidentally, the STJ has quietly accepted the prevalence of the principle of proportionality in the reparation of ecological damage, as the following section of the court's decision shows:

> In the case in point, the judgment under appeal, even though it acknowledges that the Term of Adjustment of Conduct, signed by the parties, does not fully comply with environmental legislation, in the light of the peculiarity of the claim, it concluded that it was impossible to restore the original vegetation, in order to be totally urbanized. It, therefore, concluded that the agreement reached in the TAC under discussion was reasonable. V. In that context, the Court of origin […] acknowledged that "this provision, although insufficient to restore the original vegetation, seems to be the most appropriate measure to the uniqueness of the case, in the light of the principle of proportionality and common sense, "concluding that" the TAC fully covers what is required in this PUBLIC CIVIL ACTION. " (STJ, AgInt in AREsp 703837/SP, Rapporteur Minister Assusete Magalhães, 2nd Chamber, DJe 09/27/2016).

CONCLUSION

As a conclusion for the article, it can be seen that the doctrine, legislation and case law, when analyzed together, show that reparation for ecological damage is done primarily through natural restoration which, as we have seen, is not confused with an abstract back to a pristine past and without human intervention. On the contrary, ecological repair is defined by a recovery program that indicates the limits of what to recover and how recovery should be performed.

It is important to note that the markings of the administrative action must be observed, including with regard to the proportionality of the measures to be adopted, even in economic terms. The judicial practice which, as we know, is an important element in informing which is the effective law in a given country, demonstrates that the recovery of ecological damages is not to be confused with the imposition of indemnities, except in the cases in which it is impossible to natural regeneration of the ecosystem.

The new Brazilian Civil Procedure Code assigns a high value to the judicial precedent, which may be binding or non-binding, which implies acknowledging the high value for the legal order of the stability of jurisprudence, indicating that consolidated decisions cannot simply, to be ignored (CÂMARA, 2015, p. 427).

Thus, the current law does not confuse ecological restoration with absolute repristination to the status *quo ante* of the affected area.

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