Abstract: Little is known about the institutional changes required to empower the state and develop the new regulations for environmental protection. Institutions have a strong shaping power over public policies and governance systems. The issues and limitations of the institutions that empower state intervention for environmental stewardship should be better known – as also the changes and processes which gave rise to the current framework. The central object of study is the institutional shifts that empowered state environmental action in Brazil. Therefore, we examine the institution of state environmental stewardship and analyze selected environmental protection cornerstones adopted in Brazil: the user-pays, precaution and prevention principles; the strict liability regarding the environment; the environmental harm as a crime, and the role of the district attorney or public prosecutor as a guardian of diffuse interests.

Keywords: Institutions, environmental law, governance, environmental policy, Brazil,

JEL classification: K320, H770
1. INTRODUCTION

Institutions have proven themselves poorly suited to face environmental and sustainability challenges both in developed and in developing countries (Vatn, 2005). Assuming that the state is among the key actors in solving environmental problems, institutional changes are needed to establish the environment as an object for state action to validate and support this responsibility as a part of the governmental mandate, and enable the passing of public policies for stewardship.

Since the 1970s, when environmental protection became a mainstream political concern, new conventions and regulations were adopted in international governance systems, including the European Union and the United Nations System (Molina, 2006) and environmental regulation has been developed at national level. Currently, rules for environmental stewardship have been established across several countries through specifically designed instruments. For instance, over a hundred countries passed requirements for Environmental Impact Assessments prior to the approval of projects (McAllister, 2009). Environmental quality and technology standards regulating the behavior of individuals and businesses, pollution and potentially degrading activity control systems have become widespread. In the same manner, public organizations for the enforcement of these rules were set up in several countries across several levels of government.

However, little is known about the institutional changes required to empower the state and develop these new regulations. Institutions have a strong shaping power over public policies and governance systems. The issues and limitations of the institutions that empower state intervention for environmental stewardship should be better known – as also the changes and processes which gave rise to the current framework. The extension to which institutions are decisive for effective environmental governance, and which are the most important - these are some of the questions addressed by institutional literature on environmental regulation (Enedvolsen, 2001).

In this article, we are interested in analyzing the changes in “the rules of the game” that were needed to enable state action for environmental stewardship in Brazil. Therefore, the central object of study is the institutional shifts that empowered state environmental action in Brazil.

For this purpose one may start by assuming that in Brazil there is a combination of institutional factors that governs processes and provides a unique profile to the institutional order and to environmental policies as a playing field for state action, even though similar institutional factors can be found in other countries.
Among these factors are the ordering principles of environmental law, here understood as structuralizing standards, an "irradiating order within a normative system" (Silva, 2003, *apud* Araujo, 2011) creating new assignments and redistributing responsibilities among key actors. These ordering principles generate standards, herein defined as “the meaning of a normative enunciate” (Aley, *apud* Capelli, 2007), therefore differing from the word of the law - legislative text - in itself.

This paper points out some relevant issues in an exploratory approach. The results presented herein were obtained through literature and documents review, complemented by an analysis of selected Brazilian laws and regulations. The paper is structured as follows. The first section outlines the institution of state environmental stewardship in Brazil, which is associated to a few ordering principles, in turn presented in the second section: the principles of *precaution and prevention*; of *strict liability* regarding the environment; of *environmental harm as a crime*, of the role of the district attorney or public prosecutor as a guardian of *diffuse interests*, and the *user-pays principle*. The third section presents concluding remarks and recommendations for further research.

1. ENVIRONMENTAL STEWARDSHIP BY THE STATE IN BRAZIL

Over a brief period (1981-1988) the three essential attributes were established for defining the Brazilian state's role in environmental protection, formalizing that environment is a public good, rendering the latter an object for state supervision. These are the legal notions of the environment being a *public heritage, a diffuse interest* and a *good of common use by the people*. In Brazilian law, each of these qualifications represents a distinct content.

The concept of the environment as *public heritage*, to be protected for collective usufruct or enjoyment, was enunciated for the first time in federal law in 1981, in the National Environmental Policy Act. The expression *environmental patrimony*, or ‘asset and heritage’, does not refer to the form public property assumes in the sense of domain, but the category of goods of public interest covering both public and private property, subject to a particular discipline in the pursuit of public interests, in case in point, the safeguard of environmental quality (TOSTES, 1994, p. 2; SILVA, 2014).

The understanding of the environment as an *asset of collective interest* and as a *diffuse interest* was formally adopted in 1985, concurrently with the creation of the legal principle that allowed

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2 Law 6.938/1981, art. 2º.
3 This legal concept was introduced in Brazil in the Federal Constitution, art. 129, III and regulated by Law 7347/85 of 07/24/85. In 1990, the Consumer Code complemented Law 7347, disciplining class actions.
remedy of environmental damage: the public civil action (*Ação Civil Pública*), to be sponsored by the state prosecutors. According to Grinover (2005), Law 7347/1985 established a differentiated level of protection for transindividual interests, pertaining both the environment and consumers, through “*a set of principles and rules that, on the one hand, ruptured the individualistic framework of civil lawsuits and, on the other, ended up influencing the Civil Procedure Code*”. The Constitution of 1988 universalized the collective protection of transindividual interests or rights, without limitation regarding the object of the suit (Grinover, 2005).

The treatment of the environment as a diffuse-interest indicates the emergence of a new legal subject in the context of a new generation of rights. The collective-interest encompasses those that report to an “indeterminate, but determinable, group of people”, and as such are subject to policing, intervention, and special public oversight. The holders of diffuse interest comprise a group of an “indeterminate and indeterminable group of individuals”⁴. All persons, or an entire community, or certain members of a particular group of users of an environmental resource, may be constituted holders of the diffuse right. Among the environment’s stakeholders are included the future generations⁵. The enjoyment of private property is liable to suffer restrictions wherever such exercise may jeopardize environmental quality (Silva, 1995; Milaré, 2004).

The Brazilian Constitution of 1988 formally included environmental issues, establishing among others that “every person has the right to an ecologically balanced environment, as a common-use good essential for a healthy quality of life; the public authorities and society have the duty to safeguard and preserve it for future generations.”

The inclusion of environmental issues in this Constitution, which celebrated the country's re-democratization, represented significant innovation regarding the treatment of the environment, for the first time, as an object of constitutional provision. It viewed environmental resources from a multidimensional viewpoint, defined as indissolubly associated with, and a requirement for, a “healthy quality of life”. Furthermore, the idea of a responsibility towards future generations was established.

⁴ Law 8078-90 defines, in article 80: I - diffuse interests or rights, for the purposes of this code, are transindividual, of indivisible nature, and held by indeterminate persons, related by factual circumstances; II - collective interests or rights, as understood for the purposes of this code, are transindividual, indivisible in nature, held by a group, category or class of persons, related to each other or to the opposing party by a legal relationship [...] ⁵ SANCHEZ-SILVA, 2003; CARNEIRO, 2003, p. 102-104. Examples of such rights-holders include consumers of a certain brand of tomato extract, or the residents supplied by a particular body of water.
The constitutional enunciate of the environment as common-use asset of the people - and of environmental quality as a right inseparable from health and quality of life - were adopted in the Constitution of 1988 (article 225), defining the environment as one of three categories of public goods established by the Civil Code - proprietary government goods, special-use goods, and common-use goods of the people

Henceforth, the environment has definitely belonged to the category of transindividual goods in Brazil. It is, a typical “third generation right” reporting to all mankind, in which an undetermined community holds a stake, rupturing the public/private dichotomy. One important consequence of this classification is to bestow society with powers to require federal agencies to fulfill their mandate to prevent, control, and punish environmental damage.

Stricto sensu, the constitutional text reaffirmed and reflected the decisions taken by legislators throughout the 1980s, paving the way for the development of environmental policy and law in the country. By establishing the public authorities as the party responsible for ensuring environmental quality along with all of society, the constitutional authors laid the common responsibility upon all spheres of government, of all members of the federation – here including municipalities - to defend the environment, reaffirming the 1981 National Environmental Policy Law, which had already previously stated that the federal, state and municipal levels would be co-responsible for Environmental Protection (highlighting that municipalities received this responsibility a few years before being raised to the status of federated entities).

The inclusion of this mandate in the constitutional text consolidates the rupture with the concepts and institutional references until then in force, both those formal and those expressed in shared expectations, which up to that moment underlied the discipline and conduct of public and private agents regarding activities determinant for environmental quality. A new phase was opened in which the three levels of government, federal, state and municipal, are provided with a legal basis and unquestionable constitutional legitimacy to adopt policies, approve resource allocation, and enforce measures for environmental protection.

It would escape the purpose of this text to thoroughly analyze the consequences this change brought about; it will suffice to highlight here two key aspects. For Machado (2014), one of the most important aspects this innovation brought about is that the public authorities became no longer the mere proprietor of environmental goods, but their steward or manager - one who manages assets not of one’s own property and for that reason are held accountable for their management of these “common-use goods” of the people. Until the 1980s environmental

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6 Brazilian Civil Code, article 99.
conflicts could only be resolved in court individually, piecemeal, characterized as a violation of private interests.

The environment’s status as an object of state oversight does not come alone; the change came associated with others, considered critical to empower the state, and enable the fulfillment of its duty to safeguard of environmental quality. To wit: the adoption of the legal principles of precaution, of prevention, and the polluter-pays principle; the institution of strict liability for environmental damages; the expansion of the powers of district attorneys to embrace the role of guardians of diffuse interests; and the definition of environmental violation as a crime.

2. KEY ORDERING PRINCIPLES OF ENVIRONMENTAL REGULATION

2.1 The Preventive and Precautionary Principles

Aside from mitigation and reparation, the principle of prevention is practically a universal principle in environmental law in contemporary frameworks, and closely related to the precautionary principle. Its focus is avoiding the consummation of damage to the environment. It is present in international agreements since the 1980s, such as in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989) and numerous other international conventions, such as the Convention on Biological Diversity. In the European Union, the principle of prevention was present since its birth and emphasized from the start in the Maastricht Treaty (Machado, 2014).

The associated precautionary principle is also characterized by early action in face of a risk or hazard (Machado, 2014). It is based on the requirement applying the principle of equity in the usage and enjoyment of environmental goods. Some authors consider precaution as the continuation of a process that began with the incorporation of the term “prevention” in international agreements on natural resources adopted since 1970. Some agreements mentioned “likely harm”, while others required “evidence of serious and irreversible damage”. According to Cunha et al (2013, apud Canotillo, 2007), the precautionary principle is prior to the preventive one, “since this requires that proven hazards be eliminated, by actions to be taken before the environmental damage occurs”.

The precautionary principle is applied in a situation of scientific uncertainty, which raises the question as to how far and to what extent institutions are required to prove that risk is present (Molina, 2006). This is a tool for the management of causal relationships which may be beyond human control, applied to the protection of life, health and the environment (Artigas, 2002). It is a response to so-called postmodern society, characterized by a globalized economy and a risk-
prone society (Molina), having been applied for decades in various areas including the environment, food safety, and prevention of crime and terrorism.

Precautionary situations correspond to risk scenarios in which “one element in the causal chain between a hazard and its end effects is uncertain, in the sense that the cause-effect relationship upon which this element would be based cannot be established or rejected” (Gonçalves, 2008, 2013). According to the author, in the various definitions given to this principle, several common elements are found: the duty to act in advance in face of uncertain risks; the demand for scientific information for the assessment of risks and hazards; the consideration of a wide range of alternatives; the conducting of cost-benefit analysis; and the monitoring of measures for the development of scientific knowledge. The principle involves six concepts: preventive anticipation or pro-activity, the safeguard of environmental space through ecological error margins, proportional response, the burden of proof lying on the authors of change, and the advocacy and promotion of the cause of “inherent natural rights”. In face of the prospect of the activities that are likely to affect environmental quality, the policy decision should include the alternatives, particularly no-action alternative (or performance conditioned by specific measures) based solely on the possibility of damage occurring, without the need to scientifically prove its certainty (Artigas, 2001).

The “Rio Declaration”, a document signed in the 1992 in Rio de Janeiro by over one hundred countries during the Earth Summit, or United Nations Conference on Environment and Development, contains a clear definition of the precautionary principle. This document is considered as laying out essential principles in sustainable development:

*In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (Rio Declaration, Principle 15)*

This principle has been interpreted and revised in treaties such as the Protocol on Biosafety to the Convention on Biological Diversity, the Food Codex or Codex Alimentarius and the Maastricht Treaty (1992), and is currently present in several countries. At least two international conventions that were signed and ratified by Brazil inserted the precautionary principle in national law: the Convention on Biological Diversity and the UN Framework Convention on Climate Change. The Biodiversity Convention says that, upon observation of any threat of a significant reduction or loss of biological diversity, “Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects (...) shall not be used as a reason for postponing measures to avoid or minimize
threats (Article 10)”. The Framework Convention on Climate Change establishes in Article 3, Principles:

*The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.*

The precautionary principle has been object of concerted opposition against its application to environmental agendas. It is argued that this principle is biased and bends evidence to weigh more in one direction than the other, although both have the same epistemological guarantees, and thus twisting the worldview (Artigas, 2001 *apud* Holm, Harris, 1999). As a rational option, these authors believe that the precautionary principle is paralysis-inducing, blocking the development of any technology if there is any theoretical possibility of damage, causing it to not be a valid rule “for rational decisions”. Cross (1996) understands that those who support the precautionary principle assume erroneously that the lack of scientific assumptions “advising certain actions have greater consequences than the lack of scientific assumption counseling inaction and definitely cost lives to society”. The principle always considers the worst-case scenarios, and distracts consumers and decision-makers from known and proven threats to human health, (Whelan 1996), leading us “nowhere” (Sunstein, 2003) as, in face of uncertainty, there would be risks in both options (both doing and not doing).

The principles of precaution and of prevention were operationalized in Brazil through instruments widely used in national and subnational environmental governance systems. The first of these policy instruments was operationalized in the early seventies in the US, Environmental Impact Assessments (EIA, in Brazil *Estudos de Impacto Ambiental*), currently adopted in over a hundred countries. In Brazil, EIAs were first mentioned in legislation on pollution-critical areas in the 1970s, having been established in 1981 and regulated during the 1983-1986 period. EIAs were strengthened as a constitutional provision in 1988, emphasizing their preventive character and role in Brazilian environmental governance through the expression “Preliminary Environmental Impact Assessment” (EPIA, *Estudos Prévios de Impacto Ambiental*) (Machado, 2014).

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7 The Convention was signed on 05/09/1992, ratified by the National Congress by Legislative Decree # 2 on 02/03/1994, and went into effect in Brazil on 05/29/1994 via decree 2652 of 07/01/1998, promulgating the Convention. The principle was adopted in several other countries including Argentina, (verbatim) through Decree 2413 of 11/27/2002 (Cafferata, 2014).

8 article 9, Law 6938

9 Decree 88351/1983, modified in 1990 by decree 99274, and CONAMA Resolution 001/1986
EPIAs concern the licensing of construction projects and other activities that may potentially cause significant environmental degradation, as mentioned in the Constitution, article 225, #1, #4: “The Public Authorities shall require, by law, for the installation of [projects and construction] works that may potentially cause significant degradation of the environment activity, a Preliminary Environmental Impact Assessment, and [the results thereof] made public.” The EPIA is, therefore, a policy instrument for the defense of environmental quality, through a strategic approach as opposed to ad hoc intervention, through public law (Smith, 2014). This document consolidates performing analyses by experts on construction projects and other activities capable of modifying the environment.

The EPIA is an essentially preventive instrument, based on techniques and methodologies used in prospective studies, based on a diagnosis that sets a baseline portraying the current status of environmental processes, and whose conclusions about expected environmental effects and impacts will support planning and management activities. It may be used as a planning tool, quite simply - or additionally, also have the function of informing society about the potential risks of a project and condition the decision-making process regarding on its approval by the authorities. The EPIA, necessarily carried out prior to the official decision authorizing the enterprise, must predict the associated environmental change and estimate their cost to the environment and to society. In particular, one of the EPIA’s tasks is to determine the hazard level, the extension and magnitude of possible impacts, the degree of reversibility of these impacts and, where appropriate, undertake risk assessments. The goal is optimal regulation, not its absence: a system that effectively balances the risks of a product or activity with the risks of regulation is preferable to the rigid application of the precautionary principle.

Brazilian national environmental policy ruled, in the 1980s, that a prior analysis of potentially impacting activities are a mandatory part of the environmental licensing process for projects capable of causing significant impact. According to the Polluting Activity Licensing System established in 1981, the development of a potentially polluting activity is subject to the successful issuance of three environmental permits: a preliminary license, an installation license, and an operating license. Timeframes and deadlines are set, requirements are defined, and additional information is requested to support the authorities’ decision, based on the status of the local environment and on the activity’s potential impact. Without an EPIA evaluation by the authorities it is impossible for an entrepreneur to obtain environmental licensing. Only projects with a reduced potential for impact are not required to produce EPIAs. In Brazil, the EPIA is necessarily accompanied by an Environmental Impact Report (RIMA, Relatório de Impacto sobre Meio Ambiente), which summarizes the Assessment’s results in a clear and accessible language for laypersons.
Since 1986, EPIAs are mandatory throughout the country, for environmental licensing. The Constitution of 1988 included environmental impact studies as a constitutional provision, emphasizing their preventive character, thorough the expression Preliminary Environmental Impact Assessment. In 2001, EPIAs were incorporated into urban policy and planning instruments in the federal City Statute, alongside another similar instrument, the Neighborhood Impact Study. The EPIA are thus also considered urban policy instruments at the municipal level.

The EPIA are an environmental policy instrument used by the three spheres of government, federal, state, and municipal. Most environmental licensing is done at state levels. Some enterprises can only be licensed at the federal level. Environmental licensing systems are in operation in all states and in the Union, through IBAMA. Recently participation of municipalities in environmental licensing was regulated at federal level. However, they have been always able to inserting environmental requirements of their own in everyday licensing procedures, such as when issuing business and shop location permits, for example.

Fiorillo (2006, p. 82) calls attention to the discretionary nature of the environmental licensing process, given its dependence on the Environmental Impact Assessment, which “do not offer an objective and simple answer” and must be subject to interpretation.

2.2 Strict Liability For Environmental Damage

In the 1980s, Brazilian law adopted the principle of strict liability for environmental damage. This means that, to configure civil liability for a given environmental damage, the mere existence of the damage and a nexus with the polluting or degrading source will suffice to require its full remedy and compensation, without limit (Smith, 2014, p. 315). The reparation includes personal compensation (material and moral) and the so-called pure environmental compensation (for damage suffered exclusively by the environment); environmental damage is considered any damage to the environment caused by behaviors or activities by any natural or corporate persons of public or private law (Smith, p. 302 and seq).

The principle of strict liability was established in Brazil in 1981, through Law 693810, which states that, “without prejudice to administrative sanctions (...), the polluter is required, regardless of fault, to compensate or remedy damage caused to the environment and to any third parties affected by their [the polluter’s] activities”. The rule of joint liability among the parties prevails, thus reparation may be required of all or any of the responsible.

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10 In article 14, #10
Previously, the principle that prevailed was of fault-based liability for environmental damage (or subjective responsibility). To prosecute after the degradation of a natural good, two conditions had to be met: proving the existence of a nexus between the damage and its causing activity; and proving the agent's fault (by voluntary action or omission, negligence or reckless endangerment). Without evidence of guilt, there was no liability (Milaré, 2004).

In 1988, strict liability was included in the Federal Constitution\(^\text{11}\), to determine that behaviors and activities considered harmful to the environment would subject offenders, both individuals and corporations, to remedy damage caused to the environment and to third parties affected by their activities. Among the types of remedy, the payment of compensatory damages has been the most frequently used. But there are others, such as the recomposing or restoration of the asset (\emph{in situ}, and environmental compensation including measures such as sponsoring reforestation elsewhere.

Reaffirming and broadening the scope of the 1981 federal regulation, the Constitution of 1988 defined three types of environmental liability, independent from each other. Administrative liability, arising from a breach of administrative rules, is based on the public authorities’ capacity to impose a certain behavior or conduct upon the administered persons. Administrative powers include the police power over the environment, which a “public administration exercises over all activities and assets that affect, or may affect, the collectivity”. This liability imposes upon the offender administrative sanctions. Civil liability requires offenders to compensate for damages caused by their activities (Silva, 2014).

Criminal liability derives from the occurrence of a crime or misdemeanor, subjecting a violator to penal sanctions. With regard to the latter, since 1998, penal and administrative sanctions for environmental damage were defined in Brazil. The competence to legislate over civil and criminal liability is exclusively the Union’s.

Since the 1980s, therefore, it has been possible to prosecute authors of environmental destruction on administrative and civil grounds. The adoption of the principle of strict liability empowered the state to fulfill its environmental mandate, enabling responses to environmental degradation, through actions not only for prevention, but also for the restoration\(^\text{12}\) and recuperation\(^\text{13}\) - for instance of mineral resources, becoming a part of mining regulations - and also the reparation (article 225 # 1, 3) of the environment, regardless of any other administrative, civil and criminal penalties.

\(^{11}\) See Law 6.938/81, article 4, #1, VII; 7347/85; and the Constitution, article 225, #3
\(^{12}\) article 225 # 1, 1
\(^{13}\) article 225 # 1, 2
Among the revolutionary innovations with the adoption of this principle, is its contribution to overcome three obstacles: (i) the need to prove direct fault, to demand remedies for destruction or degradation, which became extinct with the adoption of the new principle, which now only required proof of causality between action and the damage; (ii) the former dismissal of a polluter when exercising a lawful activity, extinct with the adoption of the new principle; and (iii) the former inability to collect supra-individual compensation, now made possible through the establishment of environmental goods as diffuse interests, capable of accruing compensations and remedies (Benjamin, 2003).

2.3 Environmental Crime

Environmental regulation was completed to cover the civil, administrative and criminal grounds, with the approval of a federal law on environmental crime.] In 1998, the criminal and administrative liability of legal entities such as corporations was instituted along with new administrative sanctions.

For the first time, Brazil could rely on a single standard, concentrating provisions on environmental criminality (Soares Filho, 2013), once until then the rules in force were dispersive. Pre-existing devices that established criminal sanctions were fragmented, for example, on the issues of pollution control, waters, or fishing. They were confusing, “valuing environmental goods distinctly [arbitrarily]”, for instance defining as felonies crimes against wildlife (fauna), and as misdemeanors attacks on the vegetation (flora). (Marchesan, Capelli, 2013).

This law also disciplined “crimes of danger”, or reckless endangerment, here also incorporating the prevention principle (article 56), and the polluter-pays principle (imposing prior re-composition of the damage as a prerequisite for the penal transaction, article 27). Among the most important innovations these new rules brought were the regulating of pollution offenses, the reunion of almost all criminal offenses regarding the environment, the establishment of criminal liability for legal entities, and the criminalization of the behavior of environmental managers (BENJAMIN, 2003, p. 108 et seq). The law included the institution of criminal and administrative liability of legal entities, under the general rules for administrative sanctions.

Civil and criminal sanctions may be applied solely by the Judiciary. Administrative sanctions are applied by the direct administrations of the three political-administrative spheres.

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14 Law 9.605/98
2.4 The Public Ministry, Guardian of Diffuse Interests

The institutional framework of the Brazilian environmental governance model, in particular the treatment of the environment as a diffuse interest, incorporated a state actor of significant weight to the environmental arena: the Public Ministry (MP, Ministério Público) - the district attorney or public prosecutor office - an autonomous institution, independent from the Legislative, Executive and Judiciary branches, holding a unique position in the institutional architecture for environmental protection.

Currently the Public Ministry is one of the key protagonists in environmental defense, with ample coercive, persuasive and interpretative powers over environmental regulation. It performs a crucial role in the enforcement of environmental law throughout the country, representing society in the defense of its interests and promoting actions to punish malicious, negligent or fraudulent behavior in the public administration. Their performance opened a new “style” of environmental policy, energetic and effective (McAllister, 2004, p. 4).

Until 1985, public prosecutors acted only in the narrow field of court proceeding and criminal prosecution. With the enactment of the Law for Public Civil Action15, in 1985, it became duty of the Public Ministry to defend the juridical order, or the rule of law; the democratic regime or democracy; and any jeopardized or absent social and individual interests, including environmental protection16; extending action for the defense of society with a “prosecutor-ombudsman” profile (Goulart, [sd]). These new functions were consolidated as constitutional provisions three years after17. The constitutional authors were sensitive to a lobby promoted by Public Ministry officers to expand their role. The Public Ministry is defined as a permanent institution, essential for the jurisdicctional role of the state, with the duty of defending the “juridical order, the democratic regime, and social and individual interests” (article 127), among which the environment. The Constitution also considered as part of the Public Ministry’s mandate and institutional function the promotion of civil investigations and Public Civil Actions (ACP, Ação Civil Pública) for the protection of the environment and other diffuse and collective interests (article 129, III). Their functions include promoting public prosecutions, civil investigations, and the aforementioned civil actions, for the protection of the environment. The civil investigation is a preliminary, preparatory measure, investigating negligence and omission in taking environmental protection measures, or in causing environmental damage. When

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15 Law 7.347/1985
16 Federal Constitution, article 127. This mandate had already been defined by the National Environmental Policy in 1981, attributing powers to propose to civil suits for the repair or prevention of damage to the environment; was expanded in 1985 beyond its traditional sphere of activity, criminal and civil; and subsequently raised to a constitutional provision in 1988.
17 Constitution, article 129 et seq
instituting a civil investigation, the public prosecutors have investigative powers, producing evidence on the legality of the actors’ behavior. The ACP has been the instrument par excellence for this purpose, but the criminal and penal sphere is also used, as well as being among the powers that may issue Terms of Adjustment of Conduct (TACs).

Public Civil Actions have the purpose of defining the accountability, and remedy of, diffuse interests rights, such as environmental damage. Civil associations may propose public civil actions relying on the Public Ministry as a joint party, without cost, thus radically democratizing the access to environmental justice. However, the Public Ministry has emerged as the main national protagonist in the moving of environmental ACPs. The Public Ministry can also act upon the traditional criminal area, to fight ecological crimes, foiling public and private degraders.

Terms of Adjustment of Conduct are extrajudicial civil agreements between the Public Ministry and those parties responsible for environmental damage, for the mitigation of damage and compliance with environmental standards, representing the chosen solution for most environmental conflicts in Brazil (Cappelli, 2007; McAllister, 2009).

To fulfill its mandate, the Public Ministry received powers to supervise public bodies, including those with executive powers over the environment; this has had dramatic positive impact on the enforcement of environmental regulation. For this purpose, the Public Ministry may run investigations and propose sanctions, for illegal or negligent behavior, in the civil and criminal spheres.

The Public Ministry may also be summoned by civil organizations, greatly facilitating their access to justice. Thus it becomes, in practice, a new forum for the resolving of conflicts of interest involving the environment. Hence, important innovations were introduced here, applied by prosecutors in every state: a mechanism for horizontal accountability (O'Donnell, 1999 apud McAllister, 2004), a new channel of access to justice, the promotion of a culture of lawfulness among environmental agencies, and a new style of enforcing environmental rules, called by McAllister “prosecutorial enforcement”, considered unique among so-called developing countries, highly successful regarding the effectiveness of environmental enforcement - albeit not without its limitations and challenges, combining two styles of enforcement, the cooperative and the legalistic (McAllister, 2009).
2.5 The User-Pays (or Polluter-Pays) Principle

This principle has the objective of forcing the internalization of environmental costs and other negative externalities: a resource user must bear with all the costs to enable the use of that resource, and also the costs that arise from its use. In other words, the principle aims to ensure such costs are borne by neither the public authorities, nor by third parties – but only by the user oneself. On the other hand, the principle does not justify the imposition of fees to the effect that the price of the recourse would be increased to a level that exceeds its actual cost (Smets, 1998 *apud* Machado, 2014, p. 91). This is not a punishment, as it may be enforced without tort.

According to Machado (2014), the user-pays principle also contains the polluter-pays principle. Whoever causes deterioration must pay for the pollution that may be caused or has already been caused. Fiorillo emphasizes the importance of this distinction, between the user-pays and the polluter-pays principles, the lawfulness of consuming a collective good, requiring at any rate the application of the civil liability to environmental harm through objective liability, the priority of repairing damages, and the joint liability among partners in the remedy of damage (Fiorillo, 2013, 31). The polluter-pays principle was defined in 1972 in a recommendation issued by the Organization for Economic Cooperation and Development (OECD),

> “Natural or legal persons, whether governed by public law or by private law, must pay the costs of measures required to eliminate contamination or reduce it to the limit established by the standards or equivalent measures to assure quality of life, including those fixed by the competent public authorities.” (OECD, 1972, *apud* Fiorillo, 2103, p. 30-31).

This principle is one of the guidelines of European Community environmental law since its origins (Molina, 2006) and can be considered a corollary of the principle of strict liability, adopted by Brazil in the national environmental policy in 1981 and incorporated into the Constitution in 1988, as discussed above.

This principle was adopted in Brazil in 1981 through law 6938, that established that the national environmental policy aims to “impose upon the user the contribution for the use of environmental resources for economic purposes, and the imposition upon the polluter or predator the obligation to recover and/or remedy the damage” (article 4, #7). In the Brazilian legal system, the term “polluter” is defined thus18: “(...) a natural person or legal entity, public or private, directly or indirectly responsible for an activity that causes environmental degradation”

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18 Law 6.938/81 art. 3, parag. IV
This principle was also made into a constitutional provision in 1988 (Constitution, article 225, #3), as follows: “behaviors and activities considered harmful to the environment shall subject the offenders, individuals or legal entities, to penal and administrative sanctions, without prejudice to the obligation to repair the damage.” This principle was operationalized through the creation of several policy instruments, such as environmental compensations, charging for the use of water resources, and the payment for environmental services.

Environmental compensation is regarded as one of the ways of implementing the polluter-pays principle, anticipating potential charges for environmental damages (p. 93). Brazil has two types of financial compensation related to the environment. The first refers to the participation of states, municipalities, and organs of direct administration of the Union, in the result of the exploration of oil and natural gas, water resources for the purpose of power generation, and other mineral resources exploited in the territory, continental shelf, territorial sea, and maritime exclusive economic zone. There is a percentage in the compensation, bound by law, to fund environmental policies; a quota distributed among states, municipalities and organs of the Union; a specific quota intended to MMA [the Ministry of the Environment] to fund the national water policy; a quota for scientific research and technological development of water resources; and a specific percentage for environmental application in mining regions by IBAMA (Carneiro, 2003, p 130; IBAMA, 2005). In addition to financial compensation, states and municipalities also receive royalties.

The second type of environmental compensation was created as part of the National Conservation Area System, in the context of licensing enterprises with significant environmental impact. In this case, a percentage of around 0.5%, with a total sum consistent with the foreseen immitigable impact, for mitigation measures. This resource is paid by entrepreneurs for the development and maintenance of Conservation Areas of public domain and indirect use (IBAMA, 2005).

Charging for the use of water resources was established at the end of the 1990s, under the new model for the management of water resources (1997), as fruit of a discussion that started in the 1980s, inspired by French experience. Among the principles of this management model are: (a) water is a public good, owned by the Union or the states; (b) water is a limited natural

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19 Laws of interest on financial compensation cover the Constitution, art. 20, #1; Laws n. 7.990/89, 8001/90, 8,172/91, 9648/98, 9984/00, 9985/00 and n. 9993/00; Decrees 719/69, 1/91, 4340/02 and 5566/05; and CONAMA Resolution 002/96.
20 Currently the amount invested is around 2% to 3.5% of the venture (OLIVEIRA, apud GELUDA, 2003).
21 Federal waters include maritime, those on national territories [not states], those bathing more than one unit of the federation [states], those that serve as boundaries among states or with another country. State
resource, with economic value, and whose use is subject to authorization though licensing and payment. Based on the user-pays principle, the rationale behind charging for water resources is also based on the allocation of its economic value, encouraging its rationalization, and also to generate resources fund the Water Resource Plans – HRP\textsuperscript{22}, Planos de Recursos Hídricos.

Water uses subject to monetary charge include those that will require licensing - for example, for public supply, discharge of sewage effluent, irrigation, or power generation. In São Paulo, the discharge of industrial sewage has been charged for years. In the state of Ceará, the collection of water and the discharge of effluents has been charged since 1992. (MOTTA, 1998, p 48; Acquatella, 2000, p. 34). Charging for the use of water resources began in Brazil in 2002 in the Paraíba do Sul River basin, which supplies Rio de Janeiro metropolitan region, through the Committee for Integration of the Paraíba do Sul River Basin. In 2006, collection was started for the basins of the rivers Piracicaba, Capivari and Jundiaí, through the “PCJ Committee” (Canepa, 2010). At the state level, laws were passed creating Water Resource Management Systems, included charging for the use of water resources as a management tool (ANA, 2005a).

It is argued that, following the same logic of this principle, there is also a protector-receiver principle, through the payment for environmental services. The central idea is that the agent that protects an environmental resource for the benefit of the community, preventing its degradation, should receive incentives to do so. The protective-receiver principle has, as we see, close ties with the user-pays principle, maintaining nevertheless important distinctions.

The first experience of payment for environmental services took place as the initiative of a local municipal government, (in the city of Extrema, Minas Gerais), from the public budget. A few years later, a Payment for Environmental Services (PSA, Pagamento por Serviços Ambientais) system for the production of water was established by the state of Espírito Santo to be financed with resources from oil royalties, and by Minas Gerais state with the state water resource fund which receives compensation for areas flooded by the electric utility industry (Veiga Neto and May, 2010, p. 324). It is already mentioned as a guiding principle for specific public policies, such as on solid waste, established in 2010\textsuperscript{23}.

\begin{footnotesize}
\begin{itemize}
\item waters include groundwater and surface [sweet] waters, except those deemed as Federal (MILARÉ, 2004, p. 582).
\item These should translate the policy guidelines on the management of certain bodies of water, and define priorities for licensing purposes and for the destination of raised funds, to be approved by the Watershed Committees.
\item Law 12.305/2010
\end{itemize}
\end{footnotesize}
3. CONCLUSIONS

Over a relatively short time - less than a decade - the Brazilian state was empowered to intervene in a wide range of activities, through the adoption of new standards of behavior to individuals, economic groups, the private sector, and public agencies, notably impacting the environmental quality - albeit unevenly, considering the several issues on the broad national environmental agenda, and with ample variation in pro-activity among states.

Regulatory standards have been operationalized through the creation of standards of conduct and quantitative requirements (environmental standards for water, air, soil, forests, flora, fauna, etc.) and a vast array of instruments. Operationalized via prevention strategies, obligations to act and to avoid, to repair and mitigate, have solidified the power of environmental police, and the ability to suppress, control and punish environmental destruction.

These new rules, bringing binding obligations to private and public actors, belong to the highest rank of the country’s law, the constitutional order - that is, they are particularly protected against the possibility of change, or weakening, or annulment. In large part, the new rules are self-executable by the different levels of public power, regardless of regulation.

Government agencies responsible for enforcing environmental regulation are not limited to those public organizations mandated with environmental stewardship in the three spheres of government (federal, state, and municipal). In other words, protecting the environment is not an exclusive decision of the holders of executive power. The Public Ministry has played a crucial supplementary role in enforcement of regulation, both directly and indirectly, by supervising with remarkable independence the exercise of the environmental responsibilities of the Executive branch, through the diligent agency of over ten thousand federal and state prosecutors. From 1984 to 2004 about 37 000 civil investigations were opened and 4000 public civil actions moved, addressing various types of environmental degradation and destruction.

This is one of the unique aspects of environmental regulation in Brazil, as pointed out by McAllister: in the USA, the executive branch’s regulatory agencies operate chiefly through administrative suits. Public Ministry prosecutors act on behalf of several environment agencies at all government levels, which determine whether the enforcement shall be civil or criminal. A second unique aspect reports to the fact that, ten years after the establishment of the new constitutional provision, the passing of law instituting environmental crime started to exert, for the first time, a real deterrent effect on environmental chronic offenders.
A variety of organizational arrangements was adopted at the federal, state and municipal levels for the enforcement of the new regulations. These new rules have succeeded to effectively “constrain and shape courses of action and the directions of subsequent institutional developments” (Room, 2011). The impressive results obtained over the 2004-2012 period, in reducing deforestation in the Amazon, is one of the examples that disprove those who claim that “the Brazilian environmental legislation is among the most advanced in the world: it just didn’t catch on”. There, the “new rules of the game” of forestry protection were first made evident. However, it is important to note that the effectiveness of this new institutional order and its enforcement varies greatly from one region to another, as is also very uneven the effectiveness of environmental regulation, according to the theme addressed in the environmental agenda.

One crucial issue is the nonexistence of regular funding for key environmental costs; another issue is the absence of a consistent federative arrangement for environmental governance. Another crucial determinant is that the constitutional provisions require an independent and environmentally qualified Judiciary, to arbitrate conflicts of distribution of power and rule interpretation. Finally, overcoming the situation of marked inequality in resources and capabilities among actors, a characteristic of the Brazilian federations, must be surmounted do that state actors may fulfill their mandate with a minimum standard of common effectiveness.

After identifying these institutional references, opens up a broad research agenda. What were the motivations and political forces that allowed these changes? How do these rules affect environmental quality, and how do they influence investment decisions? How do the organizations entrusted with the enforcing this regulation work? As highlighted by Vatn (2011), “new institutions took place, but fundamental contradictions remain: the underlying rationale of the system is continuous growth, in a world of limited environmental capacity.” What role may they play in curbing environmental stress?

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