

# The Inadequacy of the Environmental Impact Assessment as a Model for Environmental Risk and Damage Business Management

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**To cite this article:**

Ewerton Ricardo Messias. The Inadequacy of the Environmental Impact Assessment as a Model for Environmental Risk and Damage Business Management. *International Journal of Economy, Energy and Environment*. Vol. 7, No. 2, 2022, pp. 52-61.

doi: 10.11648/j.ijeee.20220702.14

**Received:** April 6, 2022; **Accepted:** April 20, 2022; **Published:** April 28, 2022

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**Abstract:** The possibility of major environmental disasters occurring, even qualified by the real risk of death, due to the licensing and operation of economic projects, without considering the cumulative and synergistic effects resulting from different projects, afflicts researchers from all over the world. Therefore, this research aimed to analyze the adequacy of the Environmental Impact Assessment (EIA) to avoid the occurrence of such environmental disasters. To that end, an analysis was carried out on the inefficiency and ineffectiveness of the EIA as a model for corporate environmental management; then, two case studies of major environmental disasters that occurred in Brazil were carried out, to verify whether environmental damage and loss of life occurred due to the disregard of the environmental variable in the planning phase of economic enterprises, for having adopted EIA as corporate environmental management model. Thus, the case studies were only carried out to demonstrate the seriousness of the disregard for the environmental variable in the planning phase of economic enterprises. In conclusion, it is emphasized that the EIA does not have a preventive character, as it is not related to the process of conceiving, choosing and preparing projects within the scope of economic enterprises.

**Keywords:** Environmental Disasters, Economic Ventures, Environmental Socioeconomic Impacts, Business Management, Loss of Life

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## 1. Introduction

The outbreak of environmental damage tends to turn out to be much greater than that expected in an environmental licensing process based on the Environmental Impact Assessment (EIA), as it lends itself to pointing out the environmental risks arising only from the economic project that is the object of that process environmental licensing, ignoring the cumulative and synergistic effects that may result from its sum with the other environmental risks contained in other economic projects, objects of other environmental licensing processes, developed in the same territorial region or hydrographic basin [11].

The problem lies in the fact that there is the possibility of occurrence of major environmental disasters, qualified, including, by the real risk of death, due to the licensing and operation of economic enterprises, without considering the

cumulative and synergistic effects resulting from different projects.

Thus, this research aimed to analyze whether EIA, as a model of corporate environmental management, proves to be able to avoid or not the occurrence of major environmental disasters, considering the cumulative and synergistic effects resulting from different projects.

To this end, it was initially analyzed whether the EIA is efficient and effective with regard to the management of risks and environmental damage within the scope of corporate environmental management.

Then, a case study was carried out about deforestation in the Legal Amazon, followed by another case study about the rupture of the fundão dam in Mariana / MG, in order to verify if the absence of the incorporation of the environmental variable at the beginning of the process decision-making, that is, in the business planning phase, may

have influenced environmental damage and loss of life<sup>1</sup>.

To obtain the results sought by the research, the method of approach followed was the deductive one, using bibliographic, legislative and jurisprudential research, having Richard A. Posner's Law and Economics as a reference system<sup>2</sup>.

## 2. Inefficiency and Ineffectiveness in Environmental Risk and Damage Management

Environmental Management aims to minimize the environmental impacts caused by human intervention in the environment, taking into account the existing uncertainties in environmental systems. For João Eduardo Prudêncio Tinoco and Leó Tadeu Robles [23] environmental management is seen as one:

*[...] system that includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources to develop, implement, achieve, critically analyze and maintain the environmental policy. It is what the company does to minimize or eliminate the negative effects caused by its activities in the environment (my own translation).*

Environmental management involves techniques, such as recovery of degraded areas, reforestation techniques, involves methods for the sustainable exploitation of natural resources, involves the study of environmental impact risks, and the study of environmental impact assessment. According to João dos Santos Vila da Silva and Rozely Ferreira dos Santos [21], environmental management involves topics such as environmental diagnostics and prognosis, in addition to environmental planning.

Thus, it can be defined that environmental management consists of a set of procedures defined a priori for territorial, institutional or business management in order to achieve the rational use of natural resources and the prevention of environmental degradation, and its consequences social and economic impacts.

According to the principle of environmental impact assessment, activities that present risks of negative impacts on the environment and, therefore, in view of the principles

of prevention and precaution, must be submitted to the competent environmental licensing, must be subject to EIA, in order to provide information capable of forming the conviction of the environmental authority responsible for issuing the license or authorization [14, 20]. The Declaration of Rio de Janeiro, one of the documents resulting from the United Nations Conference on Environment and Development, Eco-92, brings, as one of its principles, the EIA, is what is verified in principle 17 of such document:

*The environmental impact assessment, as a national instrument, will be carried out for planned activities that may have a significant adverse impact on the environment and are subject to the decision of a competent national authority [15].*

The EIA must include the identification of the potential environmental problems that can be expected, the potential benefits and losses of the project and the incorporation of appropriate mitigating measures, which even include the adequate monitoring of the problems considered critical, in order to avoid the appearance of new ones degraded areas.

It is provided for in Article 9, item III, of Law N. 6.938/1981<sup>3</sup>, as one of the instruments of the National Environment Policy, which must be carried out by the state environmental licensing bodies that are part of the National Environment System (SISNAMA) and, supplementary, by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), as provided for in Article 18 of Decree n° 99.274, of June 6, 1990<sup>4</sup>.

The EIA has steps to be observed, and each step is intended to obtain one or more environmental licenses provided for in Article 19, of Decree N. 99.274/90<sup>5</sup>, which are the Preliminary License (LP), the Installation License (LI) and the Operation License (LO).

During the phase of environmental licensing of projects, based on the principles of prevention, precaution and assessment of environmental impacts, the entrepreneur must inform the competent environmental agency about the characteristics of the enterprise that he intends to install and make it work, indicating the type of activity, location, size, among other data and information that allow the environmental licensing agency to determine the type of

<sup>1</sup> The expression life will be used in this research to cover human lives and non-human lives, because, final accounts, a special position given to human animals does not allow the disregard of nature, formatting including non-human animals, which has its own dignity [5] (my own translation).

<sup>2</sup> The economic analysis of law, as it now exists not only in the United States but also in Europe, which has its own flourishing law and economics association, has both positive (that is, descriptive) and normative aspects. It tries to explain and predict the behavior of participants in and persons regulated by the law. It also tries to improve law by pointing out respects in which existing or proposed laws have unintended or undesirable consequences, whether on economic efficiency, or the distribution of income and wealth, or other values. It is not merely an ivory-towered enterprise, at least in the United States, where the law and economics movement is understood to have influenced legal reform in a number of important areas. [...] Economic analysis of law is generally considered the most significant development in legal thought in the United States since legal realism petered out a half century ago. [18].

<sup>3</sup> Article 9 - The instruments of the National Environment Policy are: [...] III - the assessment of environmental impacts; [...], 8].

<sup>4</sup> Article 18. The state environmental agency and Ibama, on a supplementary basis, without prejudice to the applicable financial penalties, will determine, whenever necessary, the reduction of pollution-generating activities, in order to maintain gaseous or liquid effluent emissions and solid waste under the conditions and limits stipulated in the licensing granted [9].

<sup>5</sup> Article 19. The Public Authority, in the exercise of its control powers, will issue the following licenses:

I - Preliminary License (LP), in the preliminary phase of activity planning, containing basic requirements to be met in the phases of location, installation and operation, observing the municipal, state or federal land use plans;

II - Installation License (LI), authorizing the start of deployment, according to the specifications contained in the approved Executive Project; and

III - Operation License (LO), authorizing, after the necessary checks, the beginning of the licensed activity and the operation of its pollution control equipment, in accordance with the provisions of the Prior and Installation Licenses [9].

environmental study to be required.

As the environmental study presented by the entrepreneur in the project licensing phase is adequate, the environmental licensing agency will issue the LP, which will contain basic requirements to be met by the entrepreneur to obtain the LI, such as the project's adjustments to the municipal, state and federal plans of land use and occupation, and the municipality's water and sewage guidelines.

After fulfilling the requirements contained in the LP, the environmental licensing agency will issue the LI, which will authorize the implementation of the project in accordance with the provisions of the executive project. During this phase, the environmental licensing body may require technical tests to verify the effectiveness of the pollution control equipment, and it is certain that in view of the ineffectiveness of such equipment, the environmental licensing body may require its correction or replacement for adequacy of pollution control, as a requirement for the dispatch of the LO.

With the confirmation of the correct installation of the enterprise, as foreseen in the executive project and the effectiveness of the pollution control equipment, the environmental licensing body will issue the LO, authorizing the beginning of the activities and the operation of the pollution control equipment.

It appears that the EIA is carried out within the scope of the projects, that is, the EIA is used to verify the environmental risks contained in projects whose implementation decision had already been taken at an earlier stage, which is the planning phase, with the purpose of shaping projects to meet the legal parameters for obtaining the environmental licenses and/or authorizations necessary for the installation and operation of economic enterprises.

Thus, the EIA does not act as an instrument for formulating or modifying policies, plans and programs<sup>6</sup> aimed at mitigating environmental risks and damages, or even for the election of projects that will be carried out by companies. Such an instrument is limited to assessing the environmental risks linked to production process projects whose implementation has already been decided<sup>7</sup>, that is, EIA is used to legitimize the environmental viability of projects whose implementations have already been decided at an earlier stage, whatever the stage of planning.

At EIA, the environmental feasibility assessment does not take place in the planning phase, in which the design, election and preparation of projects occur, but in the implementation phase, that is, when the project already exists and its implementation has already been decided by the entrepreneurs, demonstrating the inability to integrate EIA into project planning, identified by Leonard Ortolano and

Anne Shepherd as an "integration problem"<sup>8</sup> [16].

Therefore, within the scope of the EIA, the environmental feasibility study is carried out after the decision to implement the projects already conceived, elected and prepared, lending itself only to legitimize the decisions of the entrepreneurs, with regard to the implementation of new productive processes or the expansion of existing production processes.

Because it is carried out at the end of the decision cycle, in the project implementation phase, the EIA does not have a preventive character and, in most cases, it ends up being motivated by non-scientific factors. In this sense, Leonard Ortolano and Anne Shepherd state that:

*Decisions on significant public or private development projects are not, in fact, made following the logic of the rational model. Instead, decisions are influenced by 'nonscientific' factors, such as agency and corporate power, and interest group politics [16].*

The lack of integration of EIA into the planning phase of the decision cycle is due to a culture of business management, whereby the environmental variable is not included as one of the necessary factors to support the decision on the viability of the design, the election, design and implementation of projects, unlike the economic variable.

In such a culture of business management, entrepreneurs, proponents of projects, do not give the same weight to environmental and economic objectives, as they consider irrational the use of resources to carry out the EIA to inform the planning of a given project when they do not even know about the probability of success<sup>9</sup>.

Thus, entrepreneurs understand the environmental variable simply as a restriction on economic activity and, therefore, on the viability of projects, which is why they adopt the EIA, postponing the analysis of the environmental variable until after the decision to implement the project, just to comply with legal requirements for obtaining or renewing environmental licenses, necessary for the initiation, expansion or continuity of economic activities.

With regard to sustainable development and, mainly, the protection of the environmental balance, the EIA, in spite of being able to cover a certain economic activity of efficiency<sup>10</sup>, does not render it effective<sup>11</sup>, since it is limited

<sup>8</sup> This use of EIA as an ex post facto rationalization for decisions reflects a failure to integrate EIA into project planning and is termed herein 'the integration problem' [16].

<sup>9</sup> Many project proponents would deem it irrational to do otherwise. Why use resources to conduct an EIA if the proposed project is not likely to go forward? Another cause of the integration problem is that many project proponents don't give the same weight to environmental objectives as they give to economic performance measures such as the internal rate of return [16].

<sup>10</sup> The efficiency of economic activity is embodied in the existence of an institutional arrangement that includes policies, plans and programs with the potential to avoid or minimize environmental risks and damages, through a competent prognosis.

<sup>11</sup> The effectiveness, in turn, is linked to the measurement of the results obtained by the implementation of the institutional arrangement, that is, the institutional

<sup>6</sup> The argument is often the same: EIA is not well integrated into decision making; and EIA occurs at the project level, but not generally at the policy or program level where decisions are made that foreclose some types of alternatives [16].

<sup>7</sup> Even at the project level, EIA is typically done after planners and decision makers begin advocating a particular proposal, and EIA serves largely to suggest mitigations for a project already selected [16].

to providing, in a specific project, whose implementation measures for potential mitigation of environmental risks had already been decided in the planning phase without considering the environmental variable, aiming only at obtaining or renewing environmental licenses for the implementation, expansion or continuity of economic activity, according to case.

In Brazil, as already explained, environmental licensing incorporates EIA as an instrument of the National Environment Policy in Article 9, item III, of Law N. 6.938/1981 [8]. Therefore, the EIA, carried out through the EIA, reveals itself as the fundamental regulatory instrument at all levels of government, an instrument that has become an administrative bureaucratic process, without adequate consideration of factors such as location, possible alternatives technologies, environmental impact and potential mitigation measures [2].

Efficiency is excluded from the environmental management process, in view of the non-subordination of potential mitigating measures to any institutional arrangement that contemplates the inspection of the effective production of positive results aimed at protecting and restoring the environmental balance in the face of outbreak of environmental damage.

Therefore, the step of monitoring and monitoring the implementation of the projects does not take place, nor does the proper assessment of the effectiveness of the mitigation measures for negative impacts take place, which prevents the adequate and timely identification of adverse effects that have not been anticipated in the process environmental licensing and, with that, it allows the continuity of projects that are causing damage to the environment without the appropriate mitigating consideration. Leonard Ortolano and Anne Shepherd claim that:

*[...]EIA does not ensure that projects with significant adverse effects will be stopped In many contexts this point is moot: officials often promote environmentally damaging projects if the economic benefits outweigh their negative environmental impacts [16].*

The EIA, as an environmental risk management instrument, since it is not subordinated to an institutional arrangement aimed at mitigating these risks, is limited to the specific verification of the environmental risks involved in a given project, ignoring the geographical context contained, for example, in regional development plans, river basin management plans, Economic-Ecological Zoning, Environmental Audits, environmental monitoring, among others.

This statement can be exemplified by the process of degradation of the Tietê River by industrial pollution and domestic sewage in the Greater São Paulo section.

Between the 1940s and the 1980s, the political permissiveness revealed in environmental licensing that did

not consider the cumulative and synergistic effects of the most varied economic enterprises installed along the Tietê River, resulted in the disorderly expansion of the São Paulo industrial park, which, without due environmental counterparts, resulted in the rapid infeasibility of using the waters of the aforementioned river to supply the city, due to having reached intolerable levels of pollution, noticed through the simple olfactory perception of those who enter the municipality of São Paulo by the marginal road of Tietê river. In this regard, Carlos Eduardo Morelli Tucci and Carlos André Mendes assert that:

*Although CONAMA Resolution 01/86 already stated that, in defining the area of influence of the projects, the hydrographic basin and the compatibility between government plans and programs should be considered and that, in the analysis of the environmental impacts of the project and its alternatives, they should be considered discriminated, among others, their cumulative and synergistic properties, no systematic methodology was developed for the assessment of synergistic or integrated effects. These were obstacles to the development of a more comprehensive view of the set of interventions on a region or sector, whether as projects, plans, programs or policies, which hindered the efficiency of the integrated analysis of the physical, biotic and socioeconomic means, the existence of which already existed of terms of reference [24].*

Therefore, EIA does not take into account the cumulative and synergistic effects of environmental risks, represented by the sum of all environmental risks contained in the most varied economic projects existing in a state, municipality, neighborhood or hydrographic basin. With this, the EIA favors the so-called “tragedy of the commons”, addressed in 1968 by Garret Hardin, who explained it as follows:

*The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy. As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, “What is the utility to me of adding one more animal to my herd?” This utility has one negative and one positive component. 1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1. 2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the*

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arrangement will be fully effective if it avoids potential environmental damage or, at least, minimizes the effects of inevitable environmental damage, maintaining them within the technical standards of acceptability contained in environmental licenses or authorizations.

*negative utility for any particular decision making herdsman is only a fraction of -1. Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd and another... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit-in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all [10].*

The human being, as a rational being, seeks to maximize his gain (well-being). To this end, it seeks to expand its source of obtaining wealth and, with that it generates a positive result and a negative result. The positive result is a function of the increase in its economic activity. So as long as you receive all the profits from the increment, there will be a positive result. The negative result is a function of the additional overlap created by the increase in economic activity.

Thus, if the increase in economic activity makes it possible to obtain all the profits from the increase made, with the sharing of the negative effects of this increase (negative externalities) with society, the individual economic rational decision will be to increase economic activity, without worrying with the individual rational decisions of the other human beings, who will also act in the same way in the most diverse economic activities, also generating positive results (profit), which will be internalized by them, and negative (negative externalities), which are socialized with the society.

It is in this behavior that we find the tragedy of the commons, since each human being is contained in a system that drives him to increase his economic activity without limits - in a limited world of environmental resources.

Tragedy is the destination to which all human beings are heading, each pursuing their own interest, regardless of the cumulative and synergistic effects caused by the sum of all decisions taken in isolation.

### **3. The Absence of the Incorporation of the Environmental Variable to the Analysis of Projects**

In the Legal Amazon, the agricultural frontier has been expanding for years, driven by agricultural production, which caused and has caused the replacement of forest cover through deforestation. Agricultural expansion, through agricultural production, requires a high financial implementation. In view of this, the producers, seeking to expand their economic businesses, seek financing from financial institutions.

The National Integration Plan, instituted by Decree-Law N. 1.106/1970 [7], which had among its objectives to move

the economic (and agricultural) frontier to the banks of the Amazon River, to incorporate the traditional local population into the market economy who lived on subsistence, and taking advantage of labor from the Northeast for the colonization of extensive demographic voids in that region, led to the expansion of the agricultural frontier to the Amazon. To this end, the Brazilian government started building the Transamazônica and Cuiabá-Santarém highways, as well as allocating a strip of land on the margins of each one for colonization and land reform.

All of these transformations resulted in an accelerated rate of deforestation in the Amazon and the Cerrado, biomes hitherto largely preserved, in the profusion of environmental degradation, and their consequent socio-environmental impacts throughout the country, especially in urban and industrial areas, which required development of instruments to inhibit the rapid increase in forest devastation and environmental degradation.

In 1995, the "Environmental Diagnosis of the Legal Amazon" was prepared, containing a report, a database and a set of thematic maps digitized on a scale of 1:2,500,000, which would serve as a basis for the elaboration of the future Ecological-Economic Zoning that region [12].

Two years later, the "Detailing of the Methodology for the Execution of Ecological-Economic Zoning by the States of the Legal Amazon" was published by the Territorial Management Laboratory of the Federal University of Rio de Janeiro (LAGET/UFRJ), which began to guide the execution of Ecological-Economic Zoning projects in Brazil [12].

However, only from the 2000s, with the creation of the Permanent Working Group for the Execution of Ecological-Economic Zoning, also called the ZEE-Brazil Consortium, whose function was to provide technical assistance to the coordinating committee and the institution of the basic guidelines of the Ecological-Economic Zoning in Brazil, which effectively began the execution of macro-planning and regional Ecological-Economic Zoning projects [12].

Paulo Barreto, Daniel Silva da Silva and Paula Ellinger affirm that between 1997 and 2009 around R\$ 38 billion in rural credit were contracted in the Amazon biome alone, which, added to another R\$ 45 billion in rural loans contracted in other biomes in the Amazon, total an impressive sum of R \$ 78 billion in loans contracted in the legal Amazon [4], of which, of this amount:

*Cattle farming alone received the largest share of financing (36% of the total) followed by soybeans and other grains (24%) and machinery, equipment and infrastructure (19%), which may have been used for both agriculture and livestock [4].*

Using the National Institute for Space Research's estimates, Paulo Barreto, Ritaumaria Pereira and Eugênio Arima point out that, between 1990 and 2006, 30.6 million hectares were deforested in the Amazon and, warning that the area of pastures in the Amazon may vary more or more At least, they estimate that approximately 25.3 million hectares were potentially occupied by pasture. Therefore, 75% to 81% of the total deforestation that occurred in the Amazon

between 1990 and 2005 was due to the occupation of areas deforested by livestock, this estimate, "[...] compatible with the IBGE estimate that 70% deforested areas were occupied by pastures in 1995" [3].

The influence of livestock in the deforestation of the Amazon is evidenced by the observation that "[...] the variation in the area deforested annually between 1995 and 2007 was due to the variation in the price index of live cattle (IGP in São Paulo) in the previous year (between 1994 and 2006) " so that in "[...] most years deforestation has gone up and down, respectively, according to the rise and fall in the price of cattle in the previous year". However, between 2001 and 2003, the price of live cattle fell, while the rate of deforestation rose, as it could indicate a failure in the estimate made. However, the deforestation rate went up, due to the deforestation carried out to increase the soybean plantation areas, whose price also went up in that period [3].

With regard to the fall in the volume of deforestation [3] and in credit [4] between 2005 and 2008, the researchers claim that such fall coincided with the fall in cattle and soy prices, therefore, it would have nothing to do with any change in the credit policy adopted by financial institutions to reduce deforestation.

Rural credit, obtained through subsidized financing, has led, even if indirectly, to deforestation in the Amazon, despite the prohibition of credit for clearing forests. When dealing with public subsidies for livestock in the Amazon, Paulo Barreto, Ritaumaria Pereira; Eugênio Arima state that:

*Public financial subsidies for livestock continue and there are indications that they encourage deforestation. The subsidized loan provided by the Northern Constitutional Fund - FNO should only be used to improve the quality and productivity of livestock, as the FNO prohibits investments in deforestation. However, as the FNO is a subsidy, it tends to increase investment in this activity more than would be normal (using market interest rates) and may even indirectly stimulate deforestation. For example, a farmer can clear new areas without a loan because he knows that he will earn good income using the subsidized loan to buy the herd [3].*

This statement, according to the researchers, finds indications in two studies. The first study, carried out by the team of Charles Wood, Robert Walker and Fabiano Toni, indicates that small producers located outside rural areas and without credit subsidies deforest less than those located in settlements and, therefore, covered by subsidized rural credit [25]. The second study, carried out by the team composed by Amintas Brandão Júnior and Carlos Souza Júnior, indicates that in the 343 settlements covered by the study, the rate of deforestation was four times higher compared to the average rate of deforestation in the Amazon [6].

The federal government's National Family Strengthening Program (Pronaf) was incorporated into the FNO in the Amazon, in order to further aggravate the situation. Pronaf lends resources at very low interest rates:

*[...] ranging from 1% to 4% per year depending on the scale of the project and type of loan (cost or investment -*

*details in Bacen, 2007). In addition, the federal government grants other subsidies via PRONAF as a 40% discount on the principal for loans of up to R \$ 12 thousand (PRONAF A) and a 25% default bonus on the interest rate on costing loan installments (PRONAF C). In the Amazon, these funds (called FNO Especial) are granted by Bank da Amazônia. This bank also lends FNO funds to non-family farmers (Normal FNO) with subsidized interest rates - ranging from 5% to 9% depending on the scale of the project. FNO Normal also offers a 15% discount on financial charges for those who pay their debts on time [3].*

With such low interest rates, there was a strong demand for subsidized rural credit, so that, in the period between 2003 and October 2007 alone, 14,500 financing contracts were signed, releasing approximately R\$ 1.89 billion in rural credits for ranchers, with "[...] the peak of lending occurred in 2004, coincidentally a year of peak deforestation [...]" [3].

The pressures on forest resources in the Amazon continued to be financed by financial institutions. In 2008, National Bank for Economic and Social Development (BNDES) carried out direct operations with large slaughterhouse companies, among them Bertin, JBS Friboi, Independência and Marfrig, which had the four largest operations in the bank's industrial area, whose sum reached an incredible value of R\$ 4.7 billion, amount equivalent to 40% of all capital released by the Bank in the same year. The BNDES is among the main financiers of the meatpacking sector in the legal Amazon, and it also includes:

*[...] multilateral banks such as IFC (World Bank group) and Inter-American Development Bank (IDB), as well as public and private commercial banks. Among the private sector, Bradesco recently stood out, which over the last year has carried out important operations with the Bertin group (through Bradesco BBI), with JBS Friboi and (together with Merrill Lynch and Real) with the Marfrig group [22].*

In a single month, specifically the month of January 2009, Fridge Minerva obtained two major loans from public banks, for the modernization and expansion of its units. The first financing, in the amount of R\$ 121.85 million, was obtained from BNDES, and the second, in the amount of R \$ 97 million, was obtained from Bank of Amazônia [22].

In March 2009, Fridge Independência received the second installment related to the subscription of redeemable preferred shares registered by BNDES Participations Ltda (BNDESPAR), a BNDES holding company created to manage the holdings in companies held by the bank. This installment, in the amount of R\$ 200 million, was paid, even though the slaughterhouse entered, on February 27, 2009, with a request for judicial reorganization, suspending the slaughter in many of its units in March 2009, laying off thousands of employees [22]. Bearing in mind that one of the main problems of slaughterhouses is working capital, in April 2009 the:

*[...] National Monetary Council authorized, in April 2009, R \$ 10 billion in working capital loans with subsidized*

*interest of 11.25% per year, lower than the bank's own borrowing rate, of 12,75% [22].*

However, the financial incentives for activities aimed at the meatpacking sector, causing strong pressure on forest resources in the Legal Amazon, were not exclusive to national banks alone. In June 2009, due to public civil actions brought by the Federal Public Ministry (MPF) of Pará, the International Financial Corporation (IFC), the World Bank's arm for financing the private sector, had to cancel a financing contract, in the amount R \$ 90 million, with Fridge Bertin. The public civil actions of the MPF denounced that the loan had financed undertakings that increased deforestation in southern Pará, in addition to other complaints, among which was the purchase, by Fridge Bertin, of cattle from farms located inside the *Apyterewa* indigenous area. [19].

The lack of an adequate incorporation of the environmental variable in the analysis of projects requesting financing by financial institutions led to the granting of numerous financing by public financial institutions, which ended up resulting in an increase in deforestation in the Amazon rainforest.

#### **4. The Case of Fundão Dam, Belonging to the Germano Mining Complex, in Mariana / Mg**

In the case of Mariana/MG, Empresa Samarco, controlled by Vale SA and BHP Billiton LTDA, in possession of the environmental licenses obtained after the completion of the EIA within the scope of the environmental licensing process, operated the Fundão dam, which belongs to the complex Germano mining site, in Mariana/MG, where the tailings from the iron mining economic activity were launched.

The aforementioned dam contained approximately 50 million m<sup>3</sup> of iron ore tailings. It so happens that, on November 5, 2015, it broke, immediately throwing 34 million m<sup>3</sup> of these tailings into the environment, with the remaining "[...] 16 million m<sup>3</sup> being carried, at the few, towards the sea, in the State of Espírito Santo, which is why the environmental disaster is still ongoing" [1].

The wave of water and mud formed after the dam burst caused enormous damage to its downstream, as:

*Initially, this tailing hit the Santarém dam, just downstream, causing it to overflow and forcing the passage of a mud wave for 55 km on the Gualaxo do Norte River until it flows into the Carmo River. Then, the wave of water and mud hit Bento Rodrigues, causing deaths and destruction of the village.*

*The gigantic wave of water and mud crossed the Gualaxo and Carmo rivers, entering the course of the Doce River, where it traveled about 680 km to its mouth in Linhares-ES. Along the way, the mud wave destroyed communities, urban structures, areas of permanent preservation, drastically altered the quality of the water, leading to the extermination of aquatic biodiversity, including ichthyofauna, as well as individuals of wild fauna.*

*The levels of water turbidity led to the interruption of economic activities and water supply in the municipalities with abstraction in the affected rivers. In addition to the fatalities and injuries, along the affected stretch, direct environmental and social damage was noted, such as the destruction of housing and urban structures, destruction of permanent preservation areas, isolation of communities, killing of farm animals, impact in plantations in rural areas, restrictions on fishing, damage to health, death of wild and domestic fauna, difficulty in generating electricity by the hydroelectric plants affected, suspension of water supply and damage to environmentally sensitive areas [1].*

As a result of the environmental damage that occurred and of the objective, integral and solidary environmental civil liability, there was the filing of a Public Civil Action by the Federal Public Ministry against Vale S. A.; BHP Billiton LTDA; the Federative State of Brazil; the State of Espírito Santo; the National Water Agency; the Brazilian Institute for the Environment and Renewable Natural Resources; the National Department of Mineral Production; the Chico Mendes Institute for Biodiversity; the National Indian Foundation; the National Health Surveillance Agency; the National Historical and Artistic Heritage Institute; the National Bank for Economic and Social Development; the State Forestry Institute of Minas Gerais; the Minas Gerais Water Management Institute; the Minas Gerais State Environmental Foundation; the State Institute of Historical and Artistic Heritage of Minas Gerais; the State Institute of Environment and Water Resources of Espírito Santo; the Espírito Santo State Water Resources Agency; and the Espírito Santo Agricultural and Forestry Defense Institute [13].

Thus, the Federal Public Ministry pointed out the environmental liability of all those who competed, directly or indirectly, for the occurrence of environmental damage, including private companies that operated in the exploration of economic activity; legal entities under domestic public law, municipalities and public foundations that participated in the environmental licensing process that culminated in the granting of environmental licenses and authorizations for the operation of economic activity; and the public company that financed the work and the operation of the economic activity.

In view of the damages initially measured, the Federal Public Ministry asked the Judiciary to determine for Vale and BHP Billiton, jointly and severally, the realization of a deposit in its own private fund at:

*[...] initial value of R\$ 7,752.600,000.00 (seven billion, seven hundred and fifty-two million and six hundred thousand reais), equivalent to US\$ 2,190,000,000.00 (two billion, one hundred and ninety million dollars), corresponding to 5% of the minimum prima facie valuation of the damages, which will have a destination linked to the execution of the initial and emergency socio-environmental and socio-economic programs [13].*

In addition, recognizing the failure of companies to

manage environmental risks, with a view to guaranteeing good practices and social and environmental compliance, the Federal Public Ministry requested the Judiciary to determine:

*[...] to the defendants the hiring, in 30 (thirty) days, of an external audit whose scope is to evaluate the corporate governance of each of the companies, their culture and norms of environmental risk management, associated with the practices adopted, determining correction of behavior and values that adjust to the needs of sustainable development and prevent the repetition of new environmental disasters, observing the following guidelines: a) the contracting must be carried out by one of the four large global auditing companies (Deloitte, Ernst & Young - EY; KPMG and PricewaterhouseCoopers - PwC), and cannot coincide with the one already contracted for environmental, accounting and financial auditing purposes, to prevent conflict of interest; b) the contracted company must issue periodic detailed reports that describe how accurate the determinations made to the companies are, and attest to the compliance of corporate governance, rules, internal policies and practices to those determinations; c) all reports issued must be sent to the Federal Government, the States of Minas Gerais and Espírito Santo, and the Federal Public Ministry; d) all internal documentation pertinent to the examination and inspection of the diagnosis made by the audit and compliance with the determinations must be forwarded to the competent public bodies, including the Public Prosecutor's Office, without opposition to secrecy or business strategy; e) the audit and control procedure must last, at least, for 20 (twenty) years; f) the hiring of another company, outside the universe of the four mentioned above, must be preceded by judicial authorization and ministerial manifestation, fully demonstrating the impossibility of doing so due to formal refusal or reason that is considered as sufficient justification for the act, always respected the guidelines for qualification and technical capacity, and independence [13].*

It appears that business management models, which adopt EIA as a sustainability management tool in Brazil, do not incorporate the environmental variable in the planning phase, that is, in the initial phase of the decision-making process, the phase in which projects and projects are conceived the viable and the unfeasible are chosen.

Such a business management model is not in line with the development model chosen by the Federative Republic of Brazil in Article 225 of the 1988 Federal Constitution, which is sustainable development<sup>12</sup>. In this sense, Carlos Eduardo Morelli Tucci and Carlos André Mendes state that:

*The implementation of development models on sustainable bases in the country has demanded integrative approaches to the management of environmental resources that allow*

*the assessment of the cumulative and synergistic impacts of interventions in a given area, to the detriment of traditional, individualized treatments, which prevent an understanding of interactions and the dynamics of the most relevant processes that define or constitute the environment [24].*

Thus, in this business management model, there is an analysis of environmental risks arising only from each project within its own environmental licensing process, with no analysis of the cumulative and synergistic effects resulting from the sum of all environmental risks contained in each project, because, as already explained, the EIA does not lend itself to such purpose, since it acts in isolation in the licensing process of each project chosen to be carried out by the company.

## 5. Conclusion

The EIA, as an instrument of environmental risk management, is restricted, exclusively, to the control of the direct impacts of projects on the environment. It is an instrument used in the project phase and not in the planning phase, when institutional policies, plans and programs are formulated, as well as the projects that will be executed by the company are chosen.

Therefore, it limits itself to assessing the environmental risks linked to production process projects whose implementation has already been decided, that is, the EIA is used to legitimize the environmental viability of projects whose implementations have already been decided at an earlier stage, whatever the stage of planning.

It means to say that, in the business management model based only on EIA, the projects that will be carried out are chosen, considering only the economic variable, that is, the projects are elected to be carried out in case of economic viability, postponing the analysis of the environmental feasibility for the implementation phase of the chosen projects.

Thus, what happens, in fact, is the adaptation of the projects chosen to the pre-established legal and infra-legal requirements for obtaining the environmental licenses necessary for the installation and operation of the economic activity.

Thus the EIA does not have a preventive character, as it has no link with the process of design, election and project elaboration, that is, at the beginning of the decision cycle, but it only has a link with the implementation process of projects, that is, at the end of the decision cycle.

It was such an attitude of corporate environmental management that made possible the occurrence of major environmental damages in Brazil, notably in the Legal Amazon and Mariana/MG, the latter also marked by the loss of countless lives.

In order to avoid new possible environmental damage and loss of life in the future, it is of utmost importance that companies have models of corporate environmental management that allow them to have institutional

<sup>12</sup> Susana Borràs Pentinat says that “[...] The concept of sustainable development is the result of the evolution of the notion of development itself, but also of the recognition that there are limits to the biosphere and its natural resources to satisfy the needs of present and future generations [17].



arrangements that make it possible, even in the planning phase, to identify the cumulative and synergistic effects that the most varied projects of economic enterprises can represent with regard to the environmental damage that will result from them.

Only then will they have a truly sustainable business management, qualified for adequately incorporating the environmental variable into environmental licensing and bank financing projects, aiming to avoid the patent imbalance between individual and collective interests, embodied, respectively, in the interest of gains and in the interests of social development and protection of the environmental balance.

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