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Research Article

POLICY, ENVIRONMENTAL RESTORATION PROJECTS AND COMPANIES SOCIAL RESPONSIBILITY

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ABSTRACT

The purpose of this article is to analyse the "Project of Ambient Recovery of the South Catarinense Carboniferous Basin". The implementation of this project was in fulfilment of the process from sentence n° 2000.72.04.002543-9, (Civil action Public n° 93.8000.533-4), at the year of condemned the guilty ones: the mining companies, the State of Santa Catarina and the Union to elaborate and to implemente a project of recovery of the areas, degraded for the extration of the coal. The carboniferous Basin encloses 1,625 appoximately in km², of which about 490 km² is degraded: the ground, the fauns and the water. (MOREIRA *et al*, 2008). Despite the relevance of the issues, the main challenge to the coal region faces is the contamination of water resources. For this reason, the actions of the Coal Basin recovery project was to promote actions to mitigate the contamination of polluted water draining that region. To guide the analysis of this issue and considering its complexity, consider the agents involved in the implementation and development of the project, establishing the counterpoints and relevant debates about environmental degradation in coal basin.

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INTRODUCTION

The XX century was marked by the technical-scientific advance, at the same time that it was faced with an environmental crisis. The destruction of the ecological system directly affects the life of man. According to Viola (1998, p. 5), "As a species we have always been simultaneously conquerors and hostages of nature, but these implications of the human adventure have become much more complex by the end of the twentieth century." That reality has made nations turn their attention to environmental problems at local and global level. In Brazil, the ecological issue was late, it began to come with the approval of the National Environmental Policy Law No. 6.938 / 81 and later with the promulgation of the Federal Constitution of 1988, which contains specific laws in favor of nature, that's when environmental projects began to be implemented in Brazil, as in the municipalities that compose the Santa Catarina coal basin.

The charcoal activity in southern Santa Catarina was explored for several decades, without the necessary care with the environment. Consequently, a large accumulation of coal tailings was generated throughout the region, turning into a real environmental disaster. This reality led the Federal Public

Ministry to file a lawsuit (No. 93.8000533-4) at the Federal Court in Criciúma / SC in 1993, to the detriment of the coal companies of the State of Santa Catarina and of the Union. (2000.72.04.002543-9), to submit a project to mitigate the environmental damage caused by the extraction of coal.

Two years after the defendants were tried and convicted, the state of Santa Catarina presented a defense. It affirmed that only from 1980, with Law 5,793 / 80, it was able to license potentially polluting activities and oblige the delivery of environmental impact reports. It claimed that the environmental sequels in the coal basin were the responsibility of the Union, due to the energy policy and the Mining Code that instrumentalized it with powers of environmental control and control. The defense was accepted in 2002 and the state of Santa Catarina was withdrawn from the lawsuit (BRASIL, 1993). In this way, the defendants became the Union and the mining companies.

In compliance with the court order, the defendants developed and implemented what was termed the "Environmental Recovery Project for the Carboniferous Southern Catarinense Basin"- Brazil. Since then, the project has been monitored and reports of environmental indicators have been prepared

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annually by the Technical Advisory Group on the Execution of the Sentence - GTA.

In order to deepen the understanding on this subject, it is proposed to characterize the environmental issue of the coal basin and to analyze the "Project for Environmental Recovery of the Carboniferous South Catarinense Basin", which involves considering the agents involved in the design and implementation of the project, its development and the results achieved so far. For this purpose, the data provided in the reports by the GTA will be used, which will include the results of the indicators, regarding the quality of surface and groundwater resources, soil cover and biotic environment. Of equal importance are the fieldwork and consultation of existing bibliography on the subject, consultation with Laws, Decrees, and the use of maps, tables and images.

Environmental Characterization in Southern Santa Catarina

The coal industry in southern Santa Catarina has been developing for more than a century. Although it has contributed to the economic progress of the region, on the other hand, it has caused disturbances and degradation in the areas where the mining is carried out. Degradation occurs when the environment loses resilience, that is, it is not able to recover itself in a reasonable time, requiring human intervention. (CORRÊA, 2006). For Sánchez (2008, p.27): "... environmental degradation can be considered as any adverse change in environmental processes, functions or components, or as an adverse change in environmental quality." Based on the author's definition, the negative impact on the environment in the coal basin can be classified as degradation.

Extraction of coal in the south of Santa Catarina has caused loss of biodiversity, loss of natural soil fertility, alteration of topography, contamination of soil, surface and groundwater. In addition, it has contributed to the emergence of gullies. This phenomenon are grooves that arise in the soil when it is poorly consolidated. In general, it occurs due to erosion caused by the action of surface water in degraded areas, tailings deposit or reclaimed areas. The gullies begin with the devegetation of a subhorizontal relief area, or on the crest of an excavation. They are common in areas of old coal mining or in unrecovered or abandoned old deposits, or where mining is in progress. (IBAMA, 1990). Despite the relevance of these issues, the most critical problem facing the coal basin is the contamination of water resources.

The coal basin is drained by three hydrographic basins, namely: Tubarão watershed, Araranguá and the Urussanga river basin. (2006), and in the present study. Figure 1 shows the delimitation of the municipalities that compose the coal basin. Area of the coal basin:



Figure 1 área of the coal basin

Source: Brazil, (2016).

The negative impacts that the coal basin presents are mentioned by Goularti (2002): "The greatest legacy left by the extraction of coal during these hundred years, without a doubt, was also one of the biggest environmental degradations in the country: 2/3 of the water sources are contaminated with heavy metals ". By the end of 1990, coal wastes were dumped unobtrusively exposed to open air in areas close to coal mining or processing sites. (Campbell *et al.*, 2010; Milioli, 1995). Table 1 shows the areas that were impacted by coal substrates.

Table 1 Classes of impacted areas (in hectares)

| clear sky | waste deposits | impacted areas |
|-----------|----------------|----------------|
| 2.900,69 | 3.134,95 | 6.191,59 |
| 3.092,91 | 3.195,22 | 6.607,44 |

Brasil (2015)

The expressive quantity of non-usable coal waste, which in most cases were discarded in natura, caused silting of the rivers, which compromises the quality of their waters. (BRANDELERO *et al.*, 2013). According to the National Water Agency - ANA (2013, page 73), "pollution derives from the infiltration of rainwater over the tailings generated in the mining and processing activities, which reach the surface and / or underground hydric bodies."

It should be noted that coal waste is still a problem in the coal basin. They are stored in deposits and later covered with clay. In addition to changing the landscape, during the period in which they are being stored, rainwater infiltrates, generating acidic water, which is drained to the rivers and compromises the water table.

Abandoned mine openings are further aggravating the contamination of water resources. Rainwater, when entering the galleries, generates acidic water, which, when leaving the galleries, drains to the surface drainage, contaminating the surface water and compromising the water table. (Brenner, 1997; Krebs, *et al.*, 2010). This situation can be observed in figure:



Figure 2 Underground mine opening:

Source: Portal do carvão (2015).

The accumulated waters in the opening of mines contribute systematically to the contamination of the water resources.

Regarding this issue, Trein (2008, p.74, 78) shows that in areas where the coal activity was developed, either by the pyrite tailings deposit or by subsurface coal mining, it was found that the aquifers are in compromised part.

Degradation in river basins affects aquatic life, fish and other animals. In fact, people living in the region are prevented from developing economic and leisure activities, such as: bathing in rivers, fishing, human or animal watering, irrigation, hygiene

and other activities. According to Ubaldo, Borma and Barbosa (2006), the pollution of rivers caused by acid drainage in the coal region is the most significant impact of mining operations.

Environmental Policy and Projects in the Coal Basin

The severe environmental impact of the coal region came to light after the survey of degraded areas in Brazil in the 1980s, in which Criciúma, one of the municipalities most affected by the coal industry, ranked 14th in the most degraded areas of the country. Decree No. 85.206 of September 25, 1980, which provides measures on the control of industrial pollution).

From this, it was verified the environmental degradation in the area that includes the coal basin of Santa Catarina, being necessary actions that made feasible the mitigation of the environmental damages in that area. In this case, environmental policies are shown to be the action of the State in defense of the environment. However, this field is not just the State, other actors are involved in the arena of environmental policy decisions. In this process, the problem is first verified; the next step is the elaboration, the choice of instruments and the implementation of public policies. (FREY, 2000, JENKINS, 1978).

The implementation of environmental projects in the coal region came in 1991, through an agreement made between the Federal Government and the governor of the State of Santa Catarina, together with the municipalities of the areas affected by the charcoal activity to create programs for recovery degraded areas. In addition, on April 15, 1993, the Federal Public Ministry, represented by the Federal Attorneys Rui Sulzbacher and José Ricardo Lira Soares, filed a Public Civil Lawsuit, no. 93.8000533-4, to the detriment of the mining companies of the region, the state of Santa Catarina and the Union. (PORTAL DO CARVÃO, 2013).

This action involved the Polluter-Payer principle, which is enshrined in Brazilian legislation, such as the law that establishes the National Environmental Policy (Law 6.938 / 81): 4th. VII: "The imposition on the polluter and the predator of the obligation to recover and / or indemnify the damages caused, and the user, from the contribution of the use of environmental resources for economic purposes." It is also found in the 1988 Constitution, (article 225, paragraph 3): "activities considered to be harmful to the environment shall subject natural or legal offenders to criminal and administrative sanctions, regardless of the obligation to repair the damage caused".

In this respect, the "polluter pays" principle is one of the environmental preservation tools based on the internalisation of costs by the polluter itself. (ARAGÃO, 1997) and, with it, the attribution of responsibility for a certain environmental damage to the polluting agent (MACHADO, 2012), so that the repair of degraded areas must be sustained by the polluter.

This indicates that the State exerts a strong influence in the elaboration and implementation of public policies. According to Mello-Theory (2011), the State of the 21st century continues to play the role of regulator in the social and territorial political order being able to define lines and to legitimize the implementation of projects in favor of nature.

It should be remembered that the advance of ecological awareness in Brazil has a strong influence on environmental discussions that have been carried out globally. An important landmark was the United Nations Conference in Stockholm in 1972, and others that followed, such as that held in Rio de Janeiro - "United Nations Conference on Environment and Development - RIO 92". The debates held at these meetings and the agreements and treaties that were produced influenced the environmental policies in Brazil. (Ribeiro, 2010). This indicates that the environmental policies that have been implemented in Brazil are also a response to the pressures that the country has received internationally regarding the need to establish technical and productive structures that minimize environmental destruction and the implementation of environmental policies in degraded areas.

This led Brazil to create measures in favor of the environment, such as the creation of SEMA in 1973. Subsequently, the National Environmental Policy Law 6,938 / 81 was approved. In this regard, Beltrão (2009: 90) stresses that this law "consists on the first legal instrument in our positive law that systematically disciplines the environment, defining environment, degradation of environmental quality, pollution, polluter and environmental resources".

In this respect, the Federal Constitution of 1988 was decisive in the formulation of laws in favor of nature. It emphasizes that everyone has the right and the duty to protect the environment and establishes that it is the common competence of the States, Federal District and Municipalities to take care of health, protect the environment and combat pollution in any of its forms.

This brings us to the statement made by Custódio (2012, 55): "that the environmental issue is first and foremost a political-economic issue ...". In this sense, the Environmental Recovery Project of the Carbonifera Sul Catarinense Basin shows to be a concrete example of a political-economic action.

Environmental Project in the Carboniferous Basin

The implementation of the Environmental Project in the South of Santa Catarina was in fulfillment of Sentence Process nº. 2000.72.04.002543-9 (Public Civil Action No. 93.8000.533-4). In general terms, the conviction (Compliance Process Judgment No. 2000.72.04.002543-9) required the defendants to submit an environmental recovery project covering the following aspects: [...] the areas of tailings deposits, outdoor mined areas and abandoned mines, as well as the desanding, fixing of ravines, decontamination and rectification of watercourses, as well as other works aimed at mitigating the damages mainly suffered by the population of the host cities of extraction and processing [...]. (CARVAL PORTAL, 2013).

As soon as the defendants were tried, they began drafting the projects, in order to mitigate the environmental damages caused by the extraction of coal. To this end, the miners sought the support of the Coal Extraction Industry Union of the State of Santa Catarina-SIECESC, as their representative, to coordinate the work to prepare the environmental recovery project, which, in turn, hired the Mineral Technology Center - CETEM, which was supported by CANMET - Natural Resources Canada. In September 2000, CETEM submitted a preliminary project, which included the collection of available

information, the characterization and description of the problem and the proposal of a management methodology. The mining companies elaborated projects concerning the degraded environmental areas, which were annexed to the Conceptual Project and handed over to the Federal Justice on September 8, 2000.

The information on the project was further elaborated and completed in March 2001. It included maps (1: 50,000 scale) of areas degraded by mining that were elaborated by JJCA in 1998, and environmental data that had been collected by the DNPM, in 1999, which showed the environmental degradation, specifically, in the Araranguá river basin, and the coal processing of the associated companies of SIECESC.

In the meantime, another important advance was the creation of a Steering Committee, which was installed on April 17, 2001 in Florianópolis. This committee aimed to coordinate, prioritize and encourage resources for the environmental recovery of the coal basin. (Federal Decree on December¹ 14, 2000).

The Steering Committee was composed of seventeen representatives of the segments of the Federal Government: the Ministry of Environment - MMA, Ministry of Mines and Energy - MME, Brazilian Institute of Environment and Renewable Natural Resources - IBAMA; representatives of the State of Santa Catarina: State Public Ministry - MPE, Ministry of Science and Technology - MCT. Representatives of civil society: Rio Araranguá Basin Committee - CBHRA, Tubarão River Basin Committee and Lagunar Complex - CBHRTCL. Other segments: Association of Municipalities of the Extreme South of Santa Catarina - AMESC, Association of Municipalities of the Carboniferous Region - AMREC, Association of Municipalities of the Region of Laguna - AMUREL, Union of Coal Extraction Industry of the State of Santa Catarina - SIECESC – and Extreme South University of Santa Catarina - UNESC. Since June 2003, the formal incorporation of the Science and Technology Foundation of the State of Santa Catarina - FUNCITEC, the Research and Mineral Resources Company - CPRM, the Federation of Workers' Trade Unions in the Extraction of Coal and an environmental NGO to be indicated by CONSEMA. (CETEM, 2000).

Since its implementation, the "Environmental Recovery Project for the Southern Carboniferous Basin of Santa Catarina" has been monitored by the Technical Advisory Group on the Sentence - GTA, composed of a team of 21 institutions and includes the defendants, the Union and other coal companies; the National Department of Mineral Production - MDPM, the Research and Mineral Resources Company - Geological Survey of Brazil - CPRM and the committees of the Araranguá, Urussanga and Tubarão hydrographic basins, the Coal Extraction Industry Union of the State of Santa Catarina - SIECESC, the Beneficent Association of the Carboniferous Industry of Santa Catarina, the Federal Public Ministry and the Foundation of the Environment of Santa Catarina - FATMA. For the best monitoring of the project, the monitoring has been subdivided among members of the GTA:

The monitoring of the ground cover is carried out by the GTA and the Technical Center of the Clean Coal-CTCL, through an agreement signed with the Union of the Industry of Extraction of Coal of the State of Santa Catarina -SIECESC, with Companhia Siderúrgica Nacional-CSN and with the CPRM. The work is carried out through the acquisition of high resolution orbital images and / or images, with georeferencing and correction of the cartographic base. From the photos, preliminary interpretation and field validation are performed to obtain qualitative and quantitative information, according to the goals set by the GTA. While groundwater monitoring is carried out through an agreement established between the Research Company and Mineral Resources -CPRM, the Beneficial Association of the Carboniferous Industry of Santa Catarina-SATC and the Bureau of Climate Change and Environmental Quality of the Ministry of Environment - MMA. The MMA is the institution that provides the resources for the installation of the monitors wells and the acquisition of images for the monitoring of the ground cover. Currently the monitored network consists of 26 wells installed, 2 wells integrated to the network and 9 wells to be installed.

As for surface water resources, they are monitored systematically, according to the plan developed by the GTA, through physical-chemical analyzes of the samples of water collected in the rivers and of flow measurements in 140 points located in the Araranguá, Urussanga and Tubarão, points that are distributed upstream and downstream of areas impacted by coal mining. (10th Monitoring Report on Environmental Indicators November / 2016).

In general, the GTA integrates geographically the necessary data for the characterization of the environmental situation of the coal region, through a geographic database and the development of a Geographic Information System - GIS. From this bank, all the data about the progress of the Project are included, which includes maps of degraded areas, graphs, results of analyzes, photos, and comparison of data since project implementation.

SATC is the industry responsible for administration, security management, and the structuring of the server and the geographic database. In November 2016, the GTA comes to its 10th edition of the report, which includes the result of environmental quality indicators that include the monitoring of surface and groundwater resources, soil cover and biotic environment. The reports are prepared annually and presented to the Federal Government, to society and to the court. (10th Monitoring Report on Environmental Indicators November / 2016).

Preliminary Project Results

The "Environmental Recovery Project for the Carboniferous South Catarinense Basin", in 2016, completed its 16th year since its implementation. According to data from the GTA (2016), of a total of 6,503.74 ha corresponding to impacted areas, 4,436.54 ha have assumed environmental responsibility. Of this total, about 2,000 ha were restored, which is equivalent to a percentage of 30% of recovered areas. This indicates that the environmental problem in the coal basin is still a reality.

According to data from the GTA (2016), the 30 abandoned mines that are monitored showed high values of electrical conductivity, acidity, sulfate and iron in the bodies of water

¹The creation of a management system for the degraded areas project in the south of Santa Catarina was proposed at the IV National Symposium on the Recovery of Degraded Areas of Blumenau-SC in the year 2000.

that are monitored. Similarly, outdoor mining contributes to contamination of water resources. This fact was verified during the field work that we carried out in the Carboniferous Basin in January 2017, as can be observed:



Figure 3 Opencast abandoned mines

Own source (2017)

The accumulation of coal tailings and the unevenness of the soil produced by the extraction of coal promote the accumulation of rainwater, where acidic water is generated, which contaminates the surface water and compromises the water table. This means that the water resources have different dimensions, in an interconnected system, that is, when surface waters are affected, they compromise the underground ones and vice versa. (Geremia, 2009, Bitar, 1997).

Regarding the three river basins that drain the coal basin, there are stretches of rivers with bad pH (percentage of Hydrogen).

Data from the GTA (2016) shows that in the Araranguá Hydrographic Basin, of the 474.0 km of stretches under influence of impacted areas, 75% (357.1 km) have $\text{pH} < 4.5$; 15% (72.3 km) and are classified as having $4.5 \leq \text{pH} < 6.0$ and 9% (44.6 km) with $\text{pH} \geq 6.0$. The sections of rivers with a poor condition ($\text{pH} < 4.5$) are concentrated in the sub-basins of the Sangão River and the Fiorita River, while Mãe Luzia, Fiorita and Criciúma rivers have an average pH. This picture can be observed during the field research that we conducted in January 2017, in which we observed the orange coloration, typical of water in the region, which characterizes the presence of iron oxides and hydroxides, as shown below:

The Urussanga River Basin presents a picture of greater concern, it is the basin that has the highest percentage of rivers impacted by acid drainage. The rivers most affected by coal mining are the rivers Carvão, Deserto, Caeté, America, Linha Anta, Ronco d'Água, Cocal and Urussanga. The rivers that present $\text{pH} < 6.0$ (12.5%) correspond to 194.9 km of impacted rivers, in 1,558 km of extension of the rivers that compose the basin.



Figure 4 Mãe Luzia river

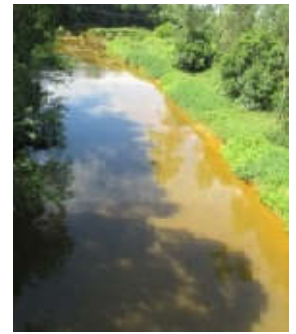


Figure 5 Sangão river



Figure 6 Carvão river

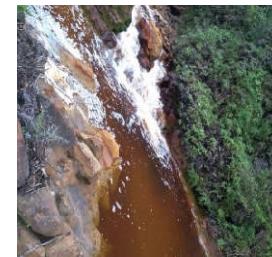


Figure 7 Carvão river

Own Source – (figure 4 e 5- January, 2017; figure 6 e 7 - January, 2018)

In Tubarão Basin, 3.9% (501.7 km) of the rivers are impacted by coal mining and correspond to the largest extension of impacted rivers in all three basins. Of this total, 289.1 km (57.62%) have a $\text{pH} < 4.5$ (bad condition), mainly in the sub-basins of the Rocinha and Palmeiras rivers. The river sections in the intermediate condition ($4.5 \leq \text{pH} < 6.0$) are located mostly in the Amaral River. (10th Monitoring Report on Environmental Indicators November / 2016).

One of the factors that interferes in the quality of the waters is the profitable tailings that still exist in abundance in the region, many of them lying on the banks of the rivers. This reality was observed during fieldwork conducted in January 2017, as illustrated below:



Figure 8 Tributary of the Sangão - Criciúma- SC

Own source (january, 2017)

Carbon tailings rich in sulfide minerals, such as pyrite and marcassite, when contacted with the aquatic fauna imply formation of acid drainage, providing a load of acidity and consequent reduction of the pH of the waters. (GONÇALVES and MENDONÇA, 2007).

Hithin a general framework, the quality of the river basins of Turbarão, Araranguá and Urussanga rivers is presented in Table 2.

Table 2 Areas of impacted river basins

| pH of water | Range of extension (km) BH Araranguá | | Range of extension (km) BH Urussanga | | Range of extensior (km) BH Tubarão | | Total | |
|----------------|--------------------------------------|-----|--------------------------------------|------|------------------------------------|-----|---------|-----|
| | Range of extension (km) | % | Range of extension (km) | % | Range of extensior (km) | % | Total | % |
| Impacted | 474 | 8,2 | 265,6 | 17 | 501,7 | 3,9 | 1.241,3 | 6,1 |
| pH < 4,5 | 357,1 | 6,2 | 171,2 | 11,0 | 289,1 | 2,2 | 817,4 | 4,0 |
| 4,5 ≤ pH < 6,0 | 72,3 | 1,2 | 23,7 | 1,5 | 25,6 | 0,2 | 121,6 | 0,6 |
| pH ≥ 6,0 | 44,6 | 0,8 | 70,8 | 4,5 | 187,0 | 1,5 | 302,4 | 1,5 |

Source (Brasil, 2016).

This is due to the contact of the pyrite with the air and with the water, consequently undergoing the oxidation process, causing the lteration of the water and soil characteristics, as a reduction of the pH and influencing in the increase of several metals that aid in the acidity of water resources.

As far as vegetation is concerned, much of it has been removed for the extraction of coal. However, due to contamination of the soil with coal tailings, the vegetation, which was removed, lost its resilience power, that is, of the soil recovering itself, being considered degraded areas. According to Kageama *et al.*, (1992), "degraded areas, and, after disturbances have eliminated their means of natural regeneration presenting low recovery power".

Thus, revegetation in areas degraded by mining has been carried out as part of the environmental recovery project that was implemented in the coal basin.

In the areas where sterile waste piles and mined areas are generally deposited, revegetation is performed after the soil morphology has been recovered, preceded by adequate compaction of the soil substrate layer and planting of plant species (grasses, legumes and shrubs), as illustrated: or grass cultivation, it is ecommended that such soils should be scattered in a 5 to 8 cm layer. For planting trees or shrubs, the depth should be greater than 30 cm.



Figure 9- Placement of organic soil in the revegetative area

Source (Patrício, 2009, p. 21)

In the case of the coal basin, the vegetation used for this procedure has been grasses and shrubs. However, recovery of the vegetal layer would only achieve the ideal result if the soil was recovered with native plant species. The area where the coal mining is developed was covered by a forest with a species of perennial trees, twenty to thirty meters high, with thick trunks and dense crowns. It is characterized, also, by the presence of three distinct strata, two arboreal and a shrub, and there may be a low one. (TEIXEIRA, 1994).

It should be noted that environmental degradation in the coal basin affects the environment as a whole, as an integrated system - when part of it is hit, all the rest is compromised.

Final Considerations

The recovery project for degraded areas in the south of Santa Catarina has evolved over the last decades in the search for situations when degraded areas are effectively corrected and stability and environmental sustainability are ensured.

The environmental quality in the coal basin has been monitored since the implementation of the project, counting on equipment with advanced technological resources, with a system of images and sophisticated resolutions. Despite all this technological apparatus, there are still about 4,000 ha degraded in the region.

The environmental degradation caused by the charcoal activity contaminated the soil, water, fauna and flora; consequently the population has been affected in developing economic and leisure activities, as well as causing damages to health.

In this way, the environmental crisis is a demonstration of the exclusion of nature, marked by a pattern of economic development based on the intense use of resources extracted from nature. (Sanchez, 2006).

In this case, the coal basin is a concrete example of exclusion of nature by the consequences that are generated. The coal mining activity is of relevance for the economic development of the region, but the main environmental consequences caused

by this sector are the loss of the natural fertility of the soil and the interference in the water resources of the region.

Therefore, the implementation of the environmental project was a necessity to mitigate the environmental damages caused by the production of coal. As we considered in the course of this study, the environmental project was in fulfillment of the Judgment Process (nº. 2000.72.04.002543-9), in which the defendants were obliged to present a project to repair the environmental damages in the areas from where the coal was extracted. For all this, it was possible to observe the role of the State as an agent capable of implementing measures in defense of the environment.

But on the other hand, even if the project of environmental recovery in the coal basin has achieved positive results, we believe that this should not be the way to go, that is, based on the cycle of degradation / regeneration; before, all citizens, businesses and the State must establish a relationship of care with the environment, with a view to ensuring a healthy environment for the present generation and for the future.

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