

# THE MINING LANDSCAPE AS AN ELEMENT OF A SENSE OF BELONGING TO THE STATE OF MINAS GERAIS

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## ABSTRACT

The landscape is a key element for the sense of belonging to a local, regional and even global community. Minas Gerais comes up as a province with mining features already in the 18th century, and even today it mining is an essential source of socioeconomic resources for it. The landscapes of mining towns were forged by this mining activity, which is an important constitutive element of the culture of Minas Gerais. This article seeks to analyze the need to protect the mining landscape as a representation of the state itself, of the sense Minas Gerais people have of belonging to this situation and as a way to understand the possibility of economically exploiting mining landscapes for developing tourism in the state. In this article, we will use the concept of landscape of the 2000 European Landscape Convention as a theoretical framework, and the inductive and deductive methods as a methodology. The technique employed was the literature investigation one and, in the end, we concluded that it is necessary to differentiate landscape from environment and understanding the importance of the mining landscape – degraded from an environmental perspective – as representing the Minas Gerais society and a way to ensure the sense individuals have of belonging to their communities, and the actual

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possibility of using it as a source of funds for the economic maintenance of cities after the end of mining activity.

**Keywords:** belonging; Minas Gerais; mining landscape; mining tourism; right to the landscape.

*PAISAGEM MINERÁRIA COMO ELEMENTO DE CONSTRUÇÃO  
DO SENTIMENTO DE PERTENCIMENTO AO ESTADO DE MINAS  
GERAIS*

*RESUMO*

*A paisagem é elemento fundamental para garantia de pertencimento dos indivíduos a sua comunidade local, regional e até mesmo global. Minas Gerais surge como uma província com feição minerária ainda no século XVIII e, ainda hoje, tem a mineração como essencial para o desenvolvimento socioeconômico. As paisagens das cidades mineiras foram forjadas a partir dessa da mineração, que é importante elemento constitutivo da cultura de Minas Gerais. O presente artigo busca analisar a necessidade de proteger a paisagem minerária mineira como representação do próprio Estado, do pertencimento do mineiro a esse contexto e compreender a possibilidade de utilização das paisagens mineiras economicamente para desenvolvimento do turismo no Estado. Para a construção do artigo utilizar-se-á como marco teórico o conceito de paisagem da Convenção Europeia de Paisagem de 2000 e como metodologia os métodos indutivo e o dedutivo, tendo por técnica a bibliográfica, para, por fim, concluir que é necessário diferenciar paisagem de meio ambiente e compreender a importância da paisagem minerária, degradada na perspectiva ambiental, como representativa da sociedade mineira e garantia do pertencimento dos indivíduos às comunidades e a real possibilidade de utilizá-la como fonte de recursos para a manutenção econômica das cidades após o fim da atividade minerária.*

**Palavras-chave:** direito à paisagem; Minas Gerais; paisagem minerária; pertencimento; turismo minerário.

## FOREWORD

The landscape is a key element for the sense of belonging to a local, regional and even global community. It is at first seen as beautiful and, later, as a subject for Geography and it reaches the 21st century as vital to ensure the acknowledgement of individuals as belonging to a community.

Minas Gerais comes up as a province with mining features already in the 18th century, and even today it mining is a key element for socioeconomic development for it.

The landscapes of mining towns were forged by the history of mining activity, and the fact that mining is an important constitutive element of the culture of Minas Gerais. Thus, this article seeks to analyze the need to ensure the protection of the mining landscape as a representation of the state itself, of the sense Minas Gerais people have of belonging to this situation and as a way to understand the possibility of economically exploiting mining landscapes for developing tourism in the state.

This research is justified by the fact that mining is an activity that modifies the environment, transforming landscapes due to its extractivist potential; however, it is also an essential element in the formation not only of a Brazilian state, but of all the culture of the Minas Gerais people that carry its name in the identity of their own being.

Mineral exploitation in the State of Minas Gerais predates the environmental concerns triggered by the Stockholm Convention of 1972, and the changes produced by mining were slow and were incorporated into and societies and established by them, thus forming an actual landscape that represents the society linked to it, and which individuals recognize themselves as belonging to. In this article, we will use the concept of landscape of the 2000 European Landscape Convention as a theoretical framework, and the inductive and deductive methods as a methodology. The technique employed was the literature investigation one and, in the end, we concluded that it is necessary to differentiate landscape from environment and the need for understanding the importance of the mining landscape – degraded from an environmental perspective – as representing the Minas Gerais society and a way to ensure the sense individuals have of belonging to their communities, and the actual possibility of using it as a source of funds for the economic maintenance of cities after the end of mining activity. That is why we must aim at its necessary protection and understand the real possibility of using it as an economic source for the economic maintenance of towns after the end of the mining activity.

At first, concepts, elements and types of landscape are presented, together with the importance of their protection as a cultural asset. After that, we talk about the mining landscape as an element of belonging for Minas Gerais societies and the importance of cultural aspects in the mine closure process. Finally, we present successful international experiences in the recovery of mined areas, considering the mining landscape as an element of environmental conservation, which could inspire alternatives for Minas Gerais.

This will be demonstrated from a case analysis of regions in France, Germany and Spain that are very similar to Minas Gerais and where protection of the mining landscape as a constitutive element of society has been presenting great appeal for the development of tourism, which has become an important economic activity in these regions.

## **1 THE LANDSCAPE**

The landscape arises from an intersection between society and the environment where it lives and is built, being the representation of social culture itself and, therefore, as changing as it is.

In the Western social imaginary, it comes up with the representations by painters from the Renaissance period; however, its representative role goes far back. Gardens in ancient Egypt already existed only for pleasure and in China the relationship between humans and the environment was already represented through pictorial figures (CUSTÓDIO, 2014).

The historical construction of its existence in the West begins with the painters and their representation in pictures that determined what deserved to be seen and admired, including their representation of landscaping gardens (such as Versailles), where the human being builds a sort of beauty not found in nature. The second phase of how the landscape is perceived comes with nineteenth-century Scientism. It becomes the object of study of Geography, bringing in structured elements that shape what the landscape is, such as strata of soil or rock formations, as well as structural configurations or landscape units. To finally arrive at contemporaneity, which begins at the end of the 20th century, together with the beginning of the expansion of the democratic state. The landscape comes to be seen as a representation of what the society connected to it sees as important to protect. In that regard, it no longer matters what deserves to be portrayed – that is, whether it is

beautiful in a general sense, or has outstanding geological or geographical strata, but rather its representativeness to that local, regional, national or even planetary communities.

The value of aesthetics has been very uneven throughout history and this can be seen in the literature of each age, particularly in relation to cities and urban centers. In some periods, beauty was considered as purely subjective. In others, however, the parameters of beauty were absolutely subject to reason. Thus, there are numerous prescriptions about material forms, proportions or colors that are part of ideals of beauty and that vary with each historical moment (RODRÍGUEZ, 2007, p. 53).

Thus, the landscape collectively establishes the criteria of what should be protected, always considering that society is constantly changing; so, in order to accompany this change and always be a representation of society, the landscape must always change. If unrecognized, it is no longer “seen” and, thus, forgotten and can therefore be destroyed. At this point, it should be understood that the landscape is not the environment and is not confused with it, since the idea of keeping the environment untouched or unmodified, whether in its natural or artificial form, often persists. Morais and Saraiva (2018, p. 31) shows this outlook “for the construction of a Socio-Environmental Rule of Law, the constitutionalization at the global level of the Fundamental Principle of the High Level of Ecological Protection as a starting point and as an internal and external boundary to States”. The landscape, on the other hand, may even be functional or unchanging, but that should not be an assumption, because it must be representative in order to guarantee its protection. This representation as a democratic feature that it requires reflects society and its culture at a given time and, therefore, must be a collective project in order to guarantee the sense of belonging; this way, the community would recognize it and fight for its existence. This can occur through landscape education, i.e., reflect its existence and maintain the feeling built over the generations that it is important and part of the structuring of that society.

With the affirmation of the democratic rule of law in the second half of the twentieth century, various segments, world views and rights have been reconsidered, such as rights of the elderly, of people with special needs, the right to social participation and the possibility of society thinking its own ways. There is no more room for the imposition of patterns as before, which created fictitious imaginaries detached from the lived reality. The time comes for each human being to recognize themselves in their space and value it and be valued by it, thus creating the landscape.

## 1.1 The concept of landscape

The concept of landscape has varied over time, but for this paper, we will adopt the one disseminated by the European Landscape Convention of 2000 which defines “For the purposes of this Convention: (a) “Landscape” means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (PORTUGAL, 2005), and continues in Art. 2:

Subject to the provisions contained in Article 15, this Convention applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas. It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes (PORTUGAL, 2005).

Here one can see the change. Today, in landscape societies, aesthetic concepts come from society. The concept of landscape is formed from the inseparability between the material construction of space (both natural and artificial, and their interaction), and its perception and representation (MARCEL, 2006). Thus, it functions as social mediation, the way in which society recognizes itself as such. It is like a movie where scenery and actors form an inseparable whole and a system everyone is a part of and recognize themselves as such. Therefore “the landscape is only visible to those who know how to recognize it and only a consciously educated look can discover this enchanting essence of the world” (PRAT, 1999, p. 39).

Human existence and the interpretation of the world are related to a place, moments represented by sounds and smells – the soundscape and olfactory-scape – that recall their belonging to a society, the very interpretation of the moment is linked to the experience of living in a place.

For a long time, the idea was to analyze the action of individuals separated from the place it takes place in. It is often forgotten that the places linked to individual experiences decisively define their contents, and help to recognize and recover these same experiences (VYGOTSKY, 2009, p. 1).

In addition, one always seeks to understand the action of individuals and societies in a particular place and environment, ignoring how they act on them and their interpretation of reality. The landscape sends us back to ourselves, and from that interpretation come the actions. Therefore, we need to be careful, because if it does not represent a totality, but only one group, it tends to be lost in time and space; “high-brow culture will tend

to erase the traditional culture and social conflicts will be increased by effective pedagogical procedures. From the point of view of ethnological analysis, traditional urban values rest in traditional values, where even caricatured folklore will exalt them” (DONAUDIEU; PERIGORD, 2005, p. 129). In addition, a globalizing pseudoculture can lead to the planning of what should and should not be considered as landscape, as, in a way, UNESCO when it comes to historical heritage. Or also like the Landscape Certification – Ordinance 127/2009 of the Brazilian National Historical Heritage Institute does, which provides the concept of landscape recognized in Brazil. The interpretative opening must be realized, as done by the European Landscape Convention, under penalty of unredeemable loss of several landscapes, because “the landscape cannot be reduced to a simple object impregnated with subjectivity, it conditions through the values that are projected in our life and identity. Bearer of values [...]” (DONAUDIEU; PERIGORD, 2005, p. 26, authors’ translation), it cannot be restricted to universal configuration values. Not that these should not be taken into account, but they cannot be the determining factors, since

[...] creating the image of a landscape is a complex process. The landscape is fundamental for a person or community and their sense of belonging and identity; it is where they shared experiences and events, shared memories and stories. The act of remembering is an act of ritualization. The practice of returning to a place, remembering the place is practiced as a ritual and causes the place to be sacralized in the community memory (STEWART; STRATHERN, 2003, p. 7).

When we think, for example, of the case of Bento Rodrigues, we can realize this sense when the demands of former residents included maintaining their homes as they were, or having the same neighbors as before. This demonstrates recognition as part of society, no matter whether any agency or company that will rebuild the city thinks of making it more modern or efficient than it was, because if the ties with the space are lost, the identity is lost; hence the need to ensure their protection.

## 1.2 Protection of the landscape

As stated, the landscape is a democratically created collective representation, and therefore its protection must be legally guaranteed. In Brazil, the history of landscape protection begins with Decree-Law 25/37, which defines it as follows.

Art. 1. The national historical and artistic heritage is constituted by all the movable and immovable property existing in the country and whose conservation is of public interest, either by its connection to memorable facts of the history of Brazil, or by its exceptional archaeological, ethnographic, bibliographic or artistic value. [...]

§ 2. Natural monuments are equivalent to the assets this article refers to and are also subject to listing, as well as the sites and landscapes that are important to preserve and protect, whether for the remarkable features with which they have been endowed by nature or by human industry (BRASIL, 1937).

It then moves on to a series of laws that insert landscape as important in several contexts, such as in tourism, as it appears in Law 6,513/77, for nature protection as it appears in Law of the National System of Conservation Units, Law 9,985/2000, the Forestry Code, Law 12,651/2012, or even in the context of cities and towns, as it appears in the Statute of Cities, Law 10,257/2001. But it is undeniable that all this protection has an undisputed constitutional bond, as determined by Arts. 216 and 216a of the Brazilian Federal Constitution of 1988.

Today, in terms of landscape protection in general, the most widespread measure is the Landscape Certification, since besides defining (cultural) landscape, it establishes strategies for its protection.

Despite the Certification being an important instrument widely used in all areas of landscape protection, its legal form is defective, since according to Hely Lopes Meirelles (2001, p. 176), they are “acts through which heads of bodies, agencies, or services issue general or special guidelines to their subordinates that do not produce external effects; that is, do not put an obligation on private individuals”, and what concepts must be legally created to be validated without question. In Brazil, this definition does not yet exist, thus protection is frail. In addition, the concept presented by the Certification is restrictive, as it is about protecting the cultural landscape, not having the broad outlook included in the European Convention, as we have seen. The novelty is the possibility of Brazil signing the Landscape Convention as determined by the European Council in the 2017 Meeting of the Parties Report, thus recognizing the initially European concept.

This universality made it possible to extend the European Landscape Convention to non-European states, whereas initially the European Landscape Convention only aimed at specifics of European identity. For example, the Protocol amending the European Landscape Convention, adopted by the Committee of Ministers on 15 June 2016 at its 1260th meeting and open for ratification, acceptance or approval on 1 August 2016, will in the future protect, manage and organize landscapes according to common principles applicable to the diversity of landscapes around the world.



In fact, on all continents, landscapes always reflect local and regional cultural identities. Given the increasing threats of global trivialization and standardization of landscapes, good landscape management in the world, which can be based on principles and guidelines intelligible to everyone, has become an urgent necessity. This is all the more necessary as the public and elected officials are aware of the now universal importance of landscape for quality of life (PRIEUR; LUGINBÜHL, 2017, p. 28).

Such recognition would facilitate the protection of the landscape in Brazil by broadening and opening the discussion about the landscape to make it into an element of democratic construction and enabling its protection in its entirety, and consequently the protection of the cultural differences that, in a country like Brazil, are huge. This would make cultural pasteurization impossible, since the concept of landscape is polysemic and based on sustainable development, one of whose elements is social development, which is always cultural in nature. Thus, the importance of the landscape as a guarantee of the quality of life of the inhabitants will increase beyond current reality, showing more clearly its function as a social unifying element and guarantor of social identity. To accomplish this, the rules of territorial organization should be reordered; they should consist of rules restricting use, public actions, and reward system (tax rebate, increase in incentives, and others) as a form of protection, management and/or transformation.

In order to protect, it is important to know what to protect, and to do so it is necessary to identify the elements that make up the landscape.

### **1.3 Elements of the landscape**

The landscape is composed of several elements and varied features, so they all must be taken into account to understand the landscape unit: its texture, complementarity, contrasts, scales, shapes that repeat themselves, possibilities of visualization, surroundings, and representation. Thus, for Roger the landscape can be a place considered as degraded, as it is essentially be a sensorial experience linked to formal aspects (FORTIN, 2003).

The landscape is formed by three main elements that bring together a series of other transverse elements in their context. We will quickly analyze each element in order to better understand this landscape formation, as well as the need and establishment of a social project linked to it.

According to Custódio (2014), to be considered as such, the landscape must have a delimited spatial element, a human element, and a subjective element.

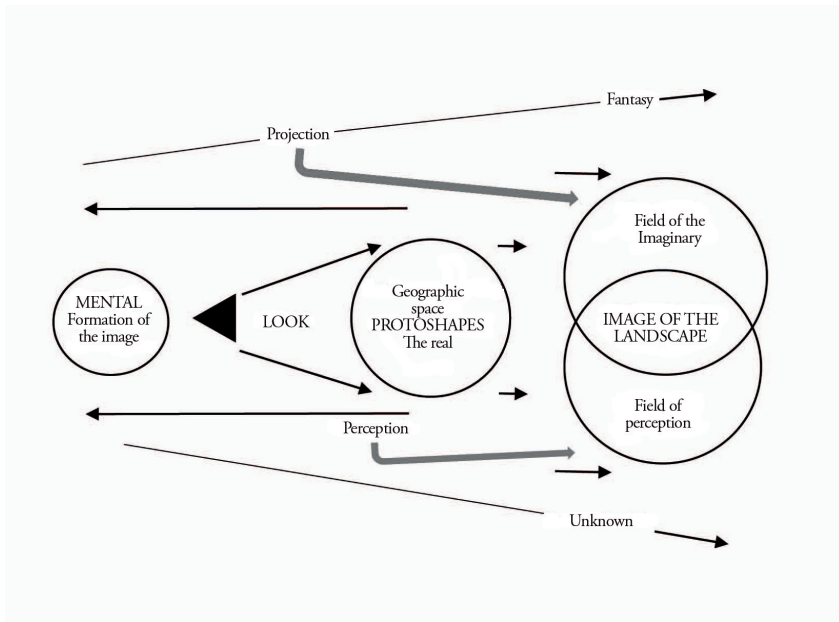
The spatial element is formed by a set of technically determined components in all its aspects: petrological, hydrological, ecological, phytogeographic biotics, and a degree of anthropization. These are analyzed within a temporal and spatial frame. This physical element must be conserved, whether it is formed by the environment or its degradation, provided its importance is socially recognized.

Here it is important to differentiate between conserving and preserving, since under Brazilian law such terms generally appear as synonyms. To preserve is to seek the integrity and perpetuity of something; according to Suzana Padua (2006), “The term refers to full protection, to ‘untouchability’. Preservation is necessary when there is a risk of loss of biodiversity, whether of a species, an ecosystem or a biome as a whole”, while conservation, despite seeking protection, allows for sustainable use and takes on a keeper’s role, but always seeking the integration of natural and cultural factors. “In conservation, human participation needs to be in harmony and always with the intention of protecting” (PADUA, 2006).

It is therefore important to use the term conserving, as this ensures the natural and even artificial mutability of the spatial element, which somehow confuses itself with the environment, but which differs from it by its need for change by and not having to be ecologically balanced, as defined it. Art. 225 of CF/88.

The human element is the society or community that observes the spatial element and gives it meaning within its socio-cultural and historical-economic context; it is of necessity a social project to guarantee its effective protection over the generations and to be democratically recognized as landscape. Without the act of seeing or feeling by an observer, there is no need to talk about landscape. Thence comes the need for viewing points; the landscape must necessarily be seen to be recognized and not lose its function of social representation.

Perception arises from the spatial element being seen by the human element. This perception is the image the observer creates out of the spatial element and that has meaning for them from the point of observation used by them, as well as their feelings, history, and emotional and mental state, as shown in Figure 1.



**Figure 1** Formation of landscape perception.

Source: adapted from Donaudieu and Perigord (2005 apud CUSTÓDIO, 2014, p. 92).

We can see that the landscape goes beyond its spatiality; it is a reproduction of community values. It represents its history, its actuality and, therefore, must be protected for future generations; that is, it is intergenerational, advancing beyond a single generation and being protective and representing the three perspectives, past, present and future. Thus arises a timeline of social insertion of the landscape and of the individuals themselves who perceive their belonging to the past and that place and want to see their children also as part of this social culture. For example, a mining-based town must reflect how it fits in as a given value and the values of the society it is a part of. That is why societies must participate in the definitions and decisions about the future or end of the mine, and this should be encouraged by the norms. With this guarantee, the awareness of its importance begins, as well as the obligation to educate and inform; this also involves understanding the types of landscape that, in spite of being fixed, lay down recognition criteria to determine what is recognized as landscape in the analyzed cultural feature.

## 1.4 Types of landscape

There are several landscape typologies, because each community can invent their own ordinary landscape – one that is not monumental – built through their feelings and gaze. According to Donaudieu and Perigord (2005, p. 9, authors' translation), "Some societies have invented forms and models to analyze it, while others are content to reproduce their legacy without understanding its scope. For these reasons, landscape shapes are major challenges for every society".

The typology adopted in this work is by Donaudieu and Perigord (2005) because it includes more than traditional landscapes, inserting new forms recognized by international organizations and society itself.

Donaudieu and Perigord (2005) break the landscape down into five major types and subdivide them according to their specificities, namely, rural and natural heritage landscapes, institutional landscapes, misery and the forgotten landscapes, landscapes of creation and (re)creation, and the type that this article is interested in, the urban, industrial or leisure landscapes.

Urban, industrial or leisure landscapes are those that were constituted for a functional purpose, but ended up becoming a representative or pictorial spot, thus becoming a landscape that seeks to be protected by societies. Mining is a part of the Industrial Landscape, which, according to Custódio (2014, p. 113),

[...] were created mainly in the 19th and 20th centuries as an expression, sometimes, of national pride, as they are symbols of development and technological progress, founded on the exploitation of mineral and energy resources. They include an architectural set of impressive aesthetics due to their boldness.

Mining fits into this context.

## 2 LANDSCAPE AND MINING

Extractive activity underpins the development of humanity, with the extraction of minerals having led to the manufacture of artifacts to empower different peoples in the development of techniques for obtaining food by means of agriculture and hunting, as well as the manufacture of weapons to defend themselves or extend their domains.

A mining process cannot be carried out in a short term, and today it depends on compliance with environmental and landscape principles. But

there were not always rules for exploitation, nor was it always seen as negative or polluting. So a quick look into the history of mining is required.

## 2.1 Mining

The Stone and Chipped Stone Ages, about 2.5 million ago, can be considered the beginning of mineral extraction using rock fragments to make cutting tools. In more recent periods, about ten thousand years BC, the transition from a nomadic to a sedentary culture took place, when several tribes began to settle in areas they ruled over. This was the time when agriculture first appeared, and extraction of materials from the soil begun, such as clay for the manufacture of household utensils for storing water, food, and for making religious artifacts and even art objects.

For historians (GHISLANZONI; DACAL, 2014), the Stone Age ends with the Metal Age, about 5,000 years BC, when some peoples came to dominate the technique of casting, using extracted copper and tin to manufacture bronze, a more malleable metal alloy. This allowed for the production of artifacts and weapons to progress.

In ancient times, noble metals such as gold and silver were also subject to great exploitation. The so-called Iron Age that came after the Bronze Age was of great importance for development in the manufacture of artifacts and weapons, as iron is one of the most abundant minerals in the earth's crust.

The extraction of noble metals such as gold and silver, and also of precious stones for the production of artifacts, decoration and jewelry has been symbols of wealth and prestige since ancient times. Egyptians, Phoenicians, and Romans are examples of how knowledge of the techniques of extractivism and the ability to work metals contributed to the development of their civilizations. In more recent times, Portugal and Spain have had their heyday with the discovery and exploitation of mines in the New World. Even today, the extraction and processing of minerals are an important basis for industry and commerce, which – enhanced by technological advancements – increasingly stand out as a factor of economic power (RIBEIRO, 2017, p. 12).

Over the years, the evolution of knowledge has led to the development of various sciences, including Geology, thus allowing the identification of deposits of the most varied minerals in the earth's crust. The Industrial Revolution in the 18th century acted as a driving force for a demand for the use of these various minerals, including thanks to the use of gunpowder and dynamite to make rock blasting easier. Starting in the 19th century, we

gained faster access to minerals to feed the growing metallurgical industry, whose products would be increasingly demanded for various uses in today's consumer society.

Mining, especially coal mining, was the central axis for industrial technology progress. The use of steam pumps and machines was a vitally important area, which grew until the mid-eighteenth century; the first step to the steel industry was the replacement of firewood by coal. In the case of the steam engine, mining provided the essential elements, iron and coal, and later received indirect contributions in the form of extraction mechanisms, equipment, transport ventilation systems, etc. (RIBEIRO, 2017, p. 14).

From fertilizer to agriculture, then civil construction, house appliances, mobile phones, vehicles, rockets, even cosmetics, today's society is entirely dependent on mineral extraction.

If, on the one hand, mining is at the base of the chain of goods and services that provides an improvement in the quality of life, on the other hand, one cannot forget the side effects on its exploitation and beneficiation processes, which translate into negative environmental impacts.

Extraction of the mineral good can occur in the open or in underground mines. Although in open pit mines the changes in the natural landscape are more significant, in both modalities the waste and tailings become new elements, changing the viewer's field of vision.

For open pit mining, it is necessary to remove the vegetation cover and upper soil layer down to the vein, where there is enough ore to justify its economic use. Stope mining deepens until the ore being mined runs out, often reaching groundwater, making it necessary to lower the water level. This excavation is called a pit, the exploitation of which is based on a Mining Plan that determines the final limits of the pit. The final explored pit area is called the end mine pit.

The sight of an open-pit mining operation, or even a depleted mine, has usually caused an unpleasant sensation in the viewer's eyes. For years, nine out of ten among hundreds of students in the Air, Visual, and Noise Pollution subject of Fumec University's Environmental Engineering Course, when asked to list the top examples of visual pollution, pointed to mining. To many, the image of a bare, dug, arid, lifeless piece of land conveys the idea of abandonment, desolation and environmental degradation.

Much of the excavated material will be composed of waste, since it does not have economically viable mined ore content and tailings from the beneficiation process to increase the amount of the desired ore. In

beneficiation there are physical processes such as grinding, and often also physical-chemical processes such as flotation, which is widely used in beneficiation of iron ore in the state of Minas Gerais.

Such kinds of mining change the existing landscape over time, creating new types that become part of the community's and family's worldview. At the end of the mining, this relationship has to be considered in the matter of environmental restoration.

## **2.2 Mining in the social imaginary of mining communities**

Mining was and still is the basis for the construction of several cities and towns, with culture and socialization built around it. Moreover, many societies were forged with mining as an inseparable social precept. It cannot be denied that work is part of the personality of individuals, so much so that, when you meet someone new, the first question is the name, and the second, what activity they do.

In a city or town where mining has been present for 50, 100 or even more years, it is impossible for mining not to be part of the social imaginary of the community or how its members interpret the world. It is there and is a visible and frequent element forging cultures. A significant example of that is the creation of a dialect called "Camaco" in the town of Itabira (MG). It was created by miners to communicate with each other during a time when mining was carried out by English people in the town, who spoke a language that made it impossible for everyone to understand their motivations or how they acted (LAMEGO et al., 2012). This prompted the miners to create a language of their own, so that the owners of the company, the English people, would not understand them either.

There is no denying the existence of a recognized mining landscape that is a representation of several societies in various parts of the world.

Today, thanks to the environmentalist thinking, mining is under great pressure to restore the environment or to create one that is more palatable to the new environmental concepts arising from the 1972 Stockholm Convention, which has been updated and expanded since then.

The environmental trend involves considering mining as destructive, degrading, offensive to the eyes.

"In almost all known cases, the end of mineral exploitation has caused a number of serious problems, the 'inevitable socioeconomic drama of

pit closure” (BAETEN et al., 1999 apud WIRTH; ČERNIČ; FISCHER, 2012, p. 14, author’s translation). Firstly, mining has been a cause of environmental degradation almost everywhere. Affected cities are often burdened with disused mining facilities, miners’ settlements, and often oversized and dilapidated infrastructure. The end of a mine plunges all economic foundations of a region in crisis. It causes high unemployment rates, with all its associated social impacts (WIRTH; ČERNIČ; FISCHER, 2012). In terms of the landscape, however, this view does not hold. Mining and its effects can be landscape elements to be legally protected, if society so wishes, as its social representation in landscape law is more important. The ecological and cultural restructuring of a former industrial region was seen as the necessary basis for a comprehensive renewal. Traditions left by the mining past can be valued to promote post-mining development. It is of crucial importance for the development of old mining towns and regions to identify these potentials and incorporate them into general development strategies (e.g. action plans and regeneration plans) (WIRTH; ČERNIČ; FISCHER, 2012). As already shown, the landscape differs from the environment and its recognition and protection comes precede it by far. The landscape is a cultural representation; it reflects the history and feelings of a community. Thus, a community where mining is a part of its history should be considered worthy of protection, even though the mining elements are not environmentally friendly from the current perspective or worthy of protection in the current global context. At this point, there is a clear separation between what is protected by environmental law and by landscape law. In the environmental view, the already-destroyed environment must be repaired, while in the landscape view, it can be the historical and even sentimental representation of a community and should be protected. It would be up to society to participate in deciding what should best be done, with technical and legal assistance in order to find a middle ground between environmental protection and landscape. The technical definition of restoring without listening to society can lead to a loss of society’s link with the environment and thus a social breakdown. The landscape is not just a static view of the environment. On the contrary, it must accompany society and change with it in order to always remain representative and belonging to the lives of individuals, who will thus keep protecting it. It is not only the beautiful, but a significant to the society it represents. Such an outlook leads to the creation of several types of landscapes, as we have shown.



Nowadays, mining is essential for the life of human beings, since it is from there that we take elements to produce practically all the non-natural elements we consume. Despite this reality, there is a strong movement to view mining as something that should not be tolerated in the current state of environmental protection. The same goes for mines after the end of the activities. They are seen as elements to be hidden, re-covered. Such an outlook may be interesting, but beyond that, one must consider what society, which has lived for so long in and around mining – as mining projects are medium to long term – think and feel about the topic.

The landscape, its recognition and its protection are democratic and, due of its social representativeness, it is not sustainable for a change to be externally imposed on a society without said society being heard.

Participation begins with education for the landscape, a seed that plants in society the interest in participating, in giving their opinion, and especially in understanding the role of mining in their lives, whether it is positive or negative. Mobility is natural in a landscape and should be considered when making decisions that must be made by the community that is already aware of its landscape, together with public agencies and business ventures; this will allow all sides and outlooks of impacts to be taken into account, whether in nature, culture, or heritage, which ultimately shape the landscape itself, both for opening and closing of mines, thus effectively fulfilling the social role of the company towards society. Thus, these decisions build the ideal product that society intends to bequeath to future generations. The closure of a mine already causes a major trauma in society, because, when it occurs, it leaves a trail and

[...] shows that everyone has to face the same challenges in overcoming the negative effects of the ending or downsizing of mining activities. The problems faced include high unemployment levels, low GDP rates, and negative demographic developments (especially the emigration of younger and more qualified people). These problems tend to occur to varying degrees, depending on the development path taken by each region and specific national and local structural conditions (WIRTH; ČERNIČ; FISCHER, 2012, p. 39, authors' translation).

When thinking about the recovery process, rather than just considering the natural element, one must consider how that society relates to the mine; as has often been said, the mine is intertwined with the culture and history of a region and cannot simply be erased from its memory just to ensure a single element of the environment, namely, its natural aspect.

It must be taken into account that the existence of the mine becomes

part of the existence of the surrounding individuals and therefore they must participate in the decisions regarding its final destination, since often merely artificially correcting nature does not meet social interests. Thus, it is necessary to open up to other ideas, such as the creation of leisure and artistic performance areas, maintaining the mine landscape as a historical representation of society, using it for tourism, or even environmental recovery. Thus keeping alive the memory of an element that has participated in society for so long, being rooted in what it means to be a member of that society and which therefore should continue to participate in some way.

The mining community expresses its culture in specific social structures, a relatively good financial situation, a strong sense of unity, pride and an introvert behavior. Miners' traditions are therefore very distinct and alien, even mysterious to foreigners. To explore the world of mining and miners, their cultural heritage as manifested in "artificial mining products" – whether material like buildings and infrastructures, or immaterial, such as miner traditions – may therefore interest both miners and the general public. A second element of the cultural potential is the mining buildings and infrastructure. Some of these relics of mining activities have been revitalized as museums, as one element of cultural potentials is tradition. It manifests itself, for example, in the customs and observances (e.g., "Miners' Day") cultivated even after the mining activity is over (WIRTH; ČERNIČ; FISCHER, 2012, p. 24, authors' translation).

Mining industries have played a crucial role in European history and have been a major factor in economic and social development over the centuries. Without the extraction of raw materials such as copper, iron, silver, salt and coal, that continent's development trajectory would have been distinctly different (WIRTH; ČERNIČ; FISCHER, 2012). And society would be different, as well. So by deploying an economic structuring project for society and its landscapes, Wirth, Černič and Fischer (2012) posit the following as elements that realize governance and democratic participation: the feasibility analysis for the appointed place, sustainability, transparency, openness and engagement of the social players, legitimacy, innovation. When replicated from another context, they must be such that they can be transposed to the place they will be applied at.

In this perspective, some successful processes have been carried out over the world. By way of example, we will analyze three iconic cases that resemble the situation in Minas Gerais. In them, the mining culture and the elements remained after the mine was closed in order to ensure social interconnection with their environment and help the members of the community feel proud of their past and wish to perpetuate the culture

they built for future generations, always with the inherent changeability of the landscape, but in a continuous line of construction as a social project, without breaking the individuals' link between their past and the future they want to build.

### **3 MINE CLOSURE AND LANDSCAPE: A REALITY BEYOND ENVIRONMENTAL RESTORATION**

As shown, mining is part of the life of many communities, and when it ends, not only the environmental perspective must be taken into account, but also the landscape perspective when giving a function to the territory where mining has stopped. According to Wirth, Černič and Fischer (2012), mining has played an essential role in European history, helping to achieve social and economic development for many centuries. And the same can be said of Brazil, especially the state of Minas Gerais.

Mining is an industrial landscape and “La industrialización y los testimonios de la historia social y de la técnica, han dejado de ser una rémora y se han convertido en recursos para el desarrollo local, con fines culturales y turístico” (Industrialization and the testimonies of social history and technology; is no longer hindrance and has become resources for local development with cultural and tourism purposes) (LÓPEZ; MACÍAS, 2008, p. 84). And today, industrialization and its forms of realization are part of human history, thus deserving protection, like any other cultural heritage. So, “está reconocida la importancia que para el estudio de las sociedades modernas tiene el patrimonio industrial que fue generado con las actividades de transformación y explotación de los sectores productivos, sobre todo a partir de la revolución industrial” (the importance that the industrial heritage that was generalized with the transformation and exploitation activities of the productive sectors has for the study of modern societies has been acknowledged, above all since the industrial revolution) (LÓPEZ; MACÍAS, 2008, p. 84). It builds, through its elements, the industrial landscape which, according to López and Macías (2008, p. 84), is constituted

[...] por un conjunto de elementos que transmiten la complejidad y la profundidad del impacto industrial tanto físico como social en una comunidad (by a set of elements that convey the complexity and depth of both the physical and social impact industry has on a community). [...] La visión sobre el patrimonio debe ser flexible y dinámica, ya que queremos identificaren ella al conjunto de elementos y prácticas sociales a

través de los cuales un colectivo pretende reconocerse y representarse (The view of heritage must be flexible and dynamic, as we want to identify it with the set of elements and social practices through which a collective intends to recognize and represent itself).

Maintaining this landscape using it for tourism of various kinds or other uses is one of the ways to have sustainable development in place, as it expands the supply of jobs, taking the place of other sectors linked to mining that are degenerating due to the mine closure.

In order to demonstrate the possibility of such a fact, we will discuss three iconic cases as examples of possibilities of a middle ground between environmental restoration and landscape protection. These are the cases of *Bassin Minier, Nord-Pas-de-Calais* in France, *Mansfeld-Südharz* in Germany and *Minerías Del Rio Tinto* in Huelva, Spain.

### **3.1 *Bassin Minier, Nord-Pas-de-Calais, France***

The Bassin Minier (Mining Basin) of Nord-Pas-de-Calais, France, is located in the center of an area of great commercial development and is an important communication hub among major European cities (ABAD, 2016). Hence, its geographical location was perfect for efficient extraction and shipment of ore. As well as its specific nature of being the only large entirely underground coal deposits, being 120 kilometers long; 12 kilometers wide, and 1.2 kilometers deep (BASSIN MINIER PATRIMOINE MONDIAL, 2019).

The history of Bassin Minier begins with the discovery of coal in 1720 by Jacques Desandrouin. But the first mining company, Anzin Mining Company, was founded in 1757. Coal exploitation was the drive of the first industrial revolution in the 1830s, peaking a century later in the 1930s (FONDATION DU PATRIMOINE, 2018). In 1946, by law, it became property of the State and was managed by Houillères du bassin du Nord et du Pas-de-Calais (HBNPC), and in 1948 it underwent a major upgrading of its facilities. Bassin Minier was vital to the reconstruction of post-World War II France in the so-called “thirty glorious years” (1945-1973) (BASSIN MINIER PATRIMOINE MONDIAL, 2019, p. 19).

In 1960, the Jeanneney Plan began the process of declining of the coal cycle, and in 1990 coal production ceased in the area. With the exhaustion of the mines, the demolition of Bassin Minier’s mining equipment begins and with it the awareness of the importance of these heritage sites and

industrial landscape emerges and grows. Thus begins the protection of some elements – including the remaining tailings piles – some of which became protected against use. Recognition of Bassin Minier begins as a representation of three centuries of industrial history, a place where populations of 29 different nationalities found shelter, together with created landscapes, cultures, and ways of life (BASSIN MINIER PATRIMOINE MONDIAL, 2019, p. 21).

On July 2, 1996, the Heritage Foundation was created by law, and in 1997 it was recognized as of public interest. It is made up of 22 regional chapters and has a network of 560 volunteers working in heritage conservation. Since its inception, it has supported 27,000 public and private projects to ensure the sustainable development of the region, contributing to the creation of jobs, professional integration and training of young people (FONDATION DU PATRIMOINE, 2018).

With the protection, the tailings piles in Bassin Minier become a symbol of the territory's resilience and witnesses to its history, and to ensure its protection, they were given a number of new uses. The former coal mining areas become sports practice areas, spaces for education, culture and leisure, including the use of structures for musical performances, plays, and a mine museum research laboratory (FONDATION DU PATRIMOINE, 2018). Protected tailings piles become the major tourist attractions, a singularity of the territory that blends into the preexisting landscape, but at the same time accepts its artificiality, becoming the symbol of this landscape, which, according to the *Bassin Minier Patrimoine Mondial* website (2019, authors' translation):

Are immediate and particularly powerful vectors of emotions that challenge our eyes and forcefully question us about the mining activity, which is now over, and yet is made very present by these monumental traits it has bequeathed. The monumentality of certain waste piles allows them to be seen from great distances.

In lesser number and smaller than the tailings piles, the 21 towers of the old mine elevators are recognized for their importance thanks to their association with the underground entrances of the mines and as witnesses to the evolution of construction and extraction techniques. Also, depending on their height, they eventually became landscape lookout places (BASSIN MINIER PATRIMOINE MONDIAL, 2019).

Bassin Minier also has 68,000 architecturally diverse mining homes built in neighborhoods with high urban quality and public facilities (schools, health clinics, etc.) necessary for everyday life. There is also a

resurgence of natural elements in the former mining areas, creating empty areas and true oases in the highly urbanized region of Nord-Pas-de-Calais, or maintaining areas resembling lunar landscapes.

Through the process of seeking recognition as a world heritage site started in 2000, Bassin Minier received in 2012 the title of “Living Evolutionary Cultural Landscape” composed of 3,563 inseparable elements (FONDATION DU PATRIMOINE, 2018).

In 2012, in the city of Lens, in the region of Nord-Pas-de-Calais, a project integrated to the mining landscape opened a unit of the Louvre museum to exhibit part of its collection. The deployment of a wind energy park in the region is currently being studied, but the impact of turbines on the protected mining industrial landscape has yet to be analyzed. Thus, the landscape changes along with society, without losing its link with the mining past it represents.

### **3.2 *Mansfeld-Südharz in Germany*<sup>3</sup>**

Mansfeld-Südharz is a region that lies between Frankfurt and Berlin, and belonged to the former East Germany. This region has a mining tradition of over 1,000 years, and was once one of the most important in the world, according to Jankowski (1995 apud HARFST; WIRTH, 2012). The most important mineral extracted in the region was copper, which was mined from 1200 to 1990. According to data from Harfst and Wirth (2012), over 50 million cubic meters of this material were excavated and had to be extracted by mining.

With the fall of the Berlin Wall and the change of regime in East Germany, which in 1990 joined West Germany, forming a single country under the political rule of the latter, mining in the region was terminated, due to not being profitable. Mainly because of beneficiation, mining leaves a huge environmental liability, with areas contaminated by heavy metals from solid waste and liquid effluents. Much inert waste has been used as road paving basis, but several areas still feature large deposits of waste in cone-shaped piles, which have become characteristic of the region as landmarks of a mining past.

The end of mining causes a situation that is common anywhere in the world where there are regions totally dependent on the activity:

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<sup>3</sup> The data for this case were taken from the research by Harfst and Wirth (2012). For more information, see the book, which is available online for free (see bibliography).

unemployment and emigration of young and skilled people. To aggravate the problem, in 1994 the only higher education institution in the region, the Mining School of Engineering, closed its doors, causing a further setback in the region, as it made it difficult to build networks to exploit post-mining heritage or even to start new activations (HARFST; WIRTH, 2012).

Due to all these difficulties, the region has received state funding for various projects, such as those for rural areas, small and medium businesses and tourism infrastructures. The funding is managed by a group represented by official mining associations, which has been more concerned with conserving the mining heritage and maintaining the industrial landscape for tourism and local awareness-raising purposes. The region has another important element to implement tourism: Martin Luther, the leader of the Protestant Reformation, who lived and died there, in the town of Eisleben, and whose father was a miner. The links with this historical figure bring an initial tourism potential because it is the hallmark of the Mansfeld region, and may be the first avenue to increase mining tourism as a way of preserving the processes that enabled the region's industrialization and became its tradition. Thus, some projects have developed tourism focused on the mining heritage. An extensive virtual data bank was created to provide information about the tourism projects in the region, thus promoting the activity. Thirteen museums were created, and one specifically for the history of mining, with materials coming from the closed Eiseben Mining School that was established in 1798. The railway was also recovered, all seeking to develop the region's tourism potential and recover its mining identity, traditions and community pride. In addition to the cultural heritage responsible for the industrial landscape, several green areas have been recovered, and post-mining potential has been used to harness geothermal energy.

The region's economic recovery has not been easy, but the projects have been successful in maintaining the landscape and a respect for the region's tradition and for the bonds of regional players.

### **3.3 *Minerías Del Rio Tinto, Huelva, Spain***

The Minerías del Rio Tinto region is located in Huelva, in Andalusia, southern Spain; from an ethnological perspective, it was the region where mining culture developed the most, proving representative in Spain, and was the forerunner of Huelva's economic and industrial development (LÓPEZ; MACÍAS, 2008).



Due to its geomorphological and bioclimatic characteristics, the original landscape of the region was formed by low relief and high altitude, covered with typical Mediterranean vegetation. But, after thousands of years of mining, the landscape was shaped, radically transforming the territory and its elements (GHISLANZONI; DACAL, 2014).

Historically, mining in the region began 5,000 years ago, still in the Copper Age, and has continued to this day. In the ancient world, it was one of the most important mining regions in the known world, and so its history is exceptional. It shows a more complete picture of the evolution of mining and metallurgical techniques (GHISLANZONI; DACAL, 2014; ABAD, 2016).

The first great period of exploitation took place in Ancient Rome, starting around 206 BC, when the Romans devoted themselves mainly to the extraction of silver in the region and left all the expression of a time with necropolis, road network and other elements. In Medieval times, the exploitation was reduced to become a family industry and in during the Islamic age, the production was mainly of elements for the manufacture of dyes. Production resumed in the Modern Age in the eighteenth century, but the mines were always assigned to foreigners seeking rapid profit, until finally taken over in 1873 by the English company Rio Tinto Limited Company, which managed it until 1954 (GHISLANZONI; DACAL, 2014). As all the extensive mining caused enormous environmental damage (FERNÁNDEZ-CALIANI; GALÁN, 1996; VAN GEEN et al., 1997 apud GONZÁLEZ et al., 2012) and also landscape damage, as exemplified by the Corta Atalaya mine that was opened in 1907 and was the largest open pit mine. The area has been exploited extensively, so that often entire cities were moved due to mining, as happened with Rio Tinto, causing a change in culture and relationship with the landscape itself. Environmental recovery was not carried out in the region because the company closed its activities before RDL1302/86, which requires environmental recovery (GONZÁLEZ et al., 2012). The changes were many and significant in all the natural, artificial and urban elements, and happened in so many stages that the Andalusian government declared part of the mining area a protected landscape (BOJA 10/2005, January 17) (GONZÁLEZ et al., 2012; ABAD, 2016).

Exploitation stopped altogether in 2001 due to the low price of the material that was extracted, and the company itself created Rio Tinto Mining Park, and established the Rio Tinto Foundation in 1987, which



began to develop the tourism project in the area, recovering heritage elements, and supporting the maintenance of the modified environment, the opening of museums, and the rehabilitation of the railway for tourist purposes, with the restoration of locomotives. But unlike in other mining areas, they did not carry out natural recovery, maintaining the transformed landscape as an aesthetic appeal. This way, they kept the open mines as they were left, as the most significant elements of the protected and recognized landscape, as well as waste piles and acidic water – which is sold as a souvenir to tourists (ABAD, 2016). The area to be protected was divided into zones in order to highlight the mining action in all its stages, forming a unique landscape that was declared as protected in 2005 as a historic site by the Andalusian Historical Heritage Law of 1991 (ABAD, 2016). But at the same time, considering the European concept of landscape, without turning it into a museum, but rather ensuring its conservation and function without impeding its development and evolution (GHISLANZONI; DACAL, 2014). Minerías del Rio Tinto is one of the most successful cases in terms of landscape maintenance recognized by society, with economic reintegration of the region and representativeness of the mining industrial landscape.

#### **4 MINAS GERAIS, MINING AND BELONGING**

Mining is the thread that guides the history and formation of the state of Minas Gerais. In the Colonial period, starting in 1690, there were already hundreds of alluvial gold mines in the central region of the state. From 1700 to 1780, Minas Gerais produced more than half of the gold and most of the gems and diamonds extracted in Brazil. This mineral production encouraged the opening of roads, such as Estrada Real, the creation of its own administrative structure, and the establishment of urban centers that led to and made possible the unification of the territory. Cities like Ouro Preto, Congonhas, Sabará, Sao João del Rei, Tiradentes, Diamantina, Serro and many others thrived around the mines. Between 1700 and 1808, the population of Minas Gerais grew 10 times from the initial number of 30 thousand inhabitants. With independence from Portugal, six British companies took over gold mining in the region, including St. John Del Rey Mining Company. With the exploitation of gold, areas of iron ore were found in the first half of the 19th century, which would foster the incipient Brazilian industry. In 1814, the first pig iron blast furnaces were installed

at a plant in Morro do Pilar, and in 1825, João Monlevade installed another plant in São Miguel do Piracicaba, a town that now bears its name. Another important factor for the technical development of the activity in the state was the establishment of the School of Mines in Ouro Preto in 1876 (ALVES, 2008).

In 1894, the exploitation of manganese began at Morro da Mina, in Conselheiro Lafaiete. In the early twentieth century, Itabira Iron Ore Corporation was established, an English company that acquired the rights to the Itabira iron ore mines and shares in the Vitória – Minas railroad. In 1940, the rights of the Itabira mines were transferred to the Brazilian government and, two years later, Vale do Rio Doce Company was formed. The 1960s were marked by the opening of the Brazilian mineral sector to foreign capital. In this situation, MBR, Samitri, Ferteco, Alcoa, CBMM and Usiminas companies appeared, together with others (ALVES, 2008, p. 30).

According to DNPM data – now National Mining Agency (ANM) – in 2014, in the state of Minas Gerais, 258,610.7 km<sup>2</sup> of areas (44.09% of the state) were in some stage of concession for mining companies, and, of these, 64,530.62 km<sup>2</sup> (11.00% of the state) had already been granted or released. In total, 40,614 enterprises have been registered, the largest number of which (4,908, or 12.08%) were iron ore (REZENDE, 2016).

With the tragedies that occurred in Bento Rodrigues, Mariana district in 2017, and in Brumadinho in 2019, discussions about mining that have never really stopped are once again the focus of attention. And mining exposes its most visible face of stronger environmental degradation, becoming disqualified and seen as a problem to be solved.

However, the tragedies only represent one perspective about mining, which reinforces the general perception of Minas Gerais society that mining is a bad thing to be dismantled and its marks, erased.

However, we must consider environmental recovery as provided for in § 2 of Art. 225 of the Brazilian Federal Constitution: “Anyone who exploits mineral resources is obliged to recover the degraded environment, according to the technical solution required by the competent public agency, as provided by law” (BRASIL, 1988). This leaves the technical solutions open to the discretion of the environmental agencies with jurisdiction on the matter.

In this regard, the State Foundation for the Environment (FEAM), inspired in the Mine Clorue international movement, which provides

for the various ways of recovering depleted mines proposed to the State Council for Environmental Policy (COPAM), includes new concepts for the environmental recovery of exhausted mines, which were embodied in Normative Decision (DN) COPAM n. 127/2008, which among other things, determines that the future use of the mined area will take into account “its aptitudes, the intention of post-operational use, the characteristics of the physical and biotic environments, and the socioeconomic aspects of the region”. This means that it would not necessarily be the conventional alternative to revegetate the whole area (MINAS GERAIS, 2008). The update of this standard by DN COPAM n. 220/2018, maintained that notion (MINAS GERAIS, 2018).

With so much exploitation time and even having its name linked to mining, the concern with the closure of mines in the various towns that today depend on them for their existence in the state of Minas Gerais is increasingly relevant. According to the Brazilian Mining Institute (IBRAM), mining in Minas Gerais accounts for 12% of its GDP, and in some mining towns, mining directly and indirectly accounts for more than 50% of revenues (CILO, 2019). Mine closure and decommissioning appear to be a problem to be addressed in order to reduce the expected impacts we have talked about – unemployment, economic downturn, and especially youth emigration, etc. – and its ignored marks. This issue comes up quite significantly in Nova Lima, which once had a mine closed, and in Itabira, which will see the end of iron reserves in the municipality in the medium term and, with it, the end of mining.

When we look at the solutions being implemented for the rehabilitation of mined areas, it is astonishing how the landscape and the bond with society are absolutely ignored. It is as if mining were an enemy finally extirpated from society that should be forgotten. Even for advantageous bets for post-mine activities, such as new technologies and digital innovations, the question arises that a mining society over a century old should not ignore its past by looking only into the future, as these causes a social disconnect where normal citizens no longer see part of that environment. It is necessary to work with the population to connect this past and its transition into the future, so as not to ignore the society’s sense of belonging to its region. Solutions must be democratic, with the participation of all social segments in order to ensure their professional insertion, but especially their insertion as members of a mining society that has leveraged the economic and industrial growth of the region and the country, thus showing the importance of the traditions created around

mining and its pride in the work done to preserve this created landscape that represents the community.

The mining regions of Minas Gerais are not so different from Bassin Minier and others around the world that we cannot consider economic insertion in the future without forgetting the past.

Itabira is an emblematic case in the state that closely resembles Mansfeld-Südharz. Known as Iron Town”, it is the place of origin of Vale do Rio Doce Company, currently Vale, and is still economically dependent on the production of iron, that has a maximum expected life of 50 years, and is already beginning to look for alternatives to the change. The initial rationale is to bet on the technology segment, but like Mansfeld, it has an important symbol in Carlos Drummond de Andrade, an internationally-recognized great Brazilian poet who was born in Itabira and has roots linked to mining. Tourism could start to be established around the poet, but it could also lead to industrial mining tourism, as the town has spanned more than a century of mining exploitation and techniques used to carry mining out. The town shows the marks of mining. Huge craters and areas where mining took place, which can be used as a basis for establishing mining tourism, interconnections with the arts, or even providing a space for sports or a green void for social leisure, so that the ties with the activity that forged the Itabira society of today are not lost.

Mining has always been an essential activity for the socioeconomic growth of Minas Gerais, because besides forging the state’s own origin, it has forged several towns and mining landscapes that need to be recognized and respected. This should begin with a survey of the history of mining regions, their heritage, and then carry out landscaping education, so that societies can see their deep link with mining and protect these landscapes. Besides the mountains, the mining industrial landscape deserves protection for all that it has meant and means for the state and society, as well as the towns and communities that depended on it and have built traditions and values that must be safeguarded as a cultural representation of a people.

## CONCLUSION

The landscape is the intersection between society and the environment it built, and is its cultural representation itself, and as changing as it is.

With the affirmation of the democratic rule of law, the landscape loses its necessary characterization of being a natural element and becomes a collective project, with social participation. The landscape has the function

of ensuring belonging and collectivity in a local, regional, national or worldwide community. And it is composed of three elements: the spatial, the human and the subjective.

As an industrial landscape, the mining landscape seeks to guarantee all those functions and is composed like any other landscape. It represents the history of industrialization and must be protected due to its importance to the past society and to link that with future generations. It is the scene of traditions and a source of pride for the roots of the community, actualizing the necessary eternal social sense of belonging.

We have analyzed the cases of *Bassin Minier, Nord-Pas-de-Calais* in France, *Mansfeld-Südharz* in Germany and *Minerías Del Rio Tinto*, in Huelva, Spain as a way of demonstrating that even with the end of mineral exploration, economic development supported by mining is possible, making social development an essential element of sustainable development.

Minas Gerais is the iconic Brazilian region when it comes to mining, because it is the activity that forged the state itself and greatly contributed to the promotion of its socioeconomic development. However, it tries to move away from this essential historical element in the forging of the Minas Gerais individual, without even understanding its representativeness or social role. This, especially after the recent tragedies of Bento Rodrigues and Brumadinho.

It is necessary to carry out landscaping education and a survey of the mining cultural heritage in the State in order to protect the mining landscape, which is representative of the history that forged Minas Gerais society, so as to ensure that society's sense of belonging and collective formation. We must leverage the pride of the past that represents them and pass on this pride to future generations in order to build a landscape that truly represents Minas Gerais.

Only in this way will Minas Gerais society become a true community concerned with establishing an actual and participatory democracy where identity and belonging are recognized.

At this time after the mining dams tragedies in Minas Gerais – Bento Rodrigues and Brumadinho –, mining companies are beginning a decommissioning process of these dams to prevent new tragedies caused by obsolete techniques like upstream elevation, which should have been banned for a long time now, and were only recently forbidden in Minas Gerais by State Law 23,291 from 26 February 2019.

Mine depletion should be designed so that there is no interruption in existing mining culture in towns where mining has developed and is rooted in social culture. Environmental protection and restoration are very important and indisputable; however, so is landscape protection, and both have constitutional protection status and should be considered equitably.

In a democratic society, we must consider that said society should participate in the decisions, and it is no longer necessary to argue that only the public administration or technicians know what is best for the community. Members of society have to participate in the decision-making; otherwise there will be no effective democracy, cultural protection, the protection of society itself.

In the cases we have presented, there are examples showing that it is possible to reconcile landscape and environmental protection. And these are examples that can inspire how to achieve this compatibility in our reality, thus achieving the precept of guaranteeing human rights and sustainable development for each community in a democratic way.

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