

## **Stone Territories:**

Challenges to spatial planning and development

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### **ABSTRACT**

The quarries are, and always have been, seen as economic activities. However, is it possible to reconcile mining activity with Local Development? In order to answer this question, three specific objectives have been defined: the description of the technical and scientific approaches dedicated to the territories that are under the influence of a quarry; presentation of existing legal guidelines for spaces containing quarries; and evaluation of relationship/conflicts between the interests involved in the quarries explorations, through the study of the role of planning in this process. Throughout the work developed within the scope of this dissertation a bibliographic research was carried out including scientific, technical documentation and legal guidelines. To this research was added the study of the Codaçal's Specific Intervention Area, contained in the territory of the Natural Park of the Serra de Aires and Candeeiros. Using the analysis of the Intervention Plans in Rural Areas (PIER) the Codaçal as a starting point, and analyzing in more detail the Ornament Plan for the Natural Park of Serra de Aires and Candeeiros and the Municipal Master Plan of Porto de Mós, where the restrictions were identified imposed by them. Some interviews were also conducted with local observers. It is concluded quarries are important economic activities for local and regional growth and development, creation of jobs, economic growth, and directly and indirectly influencing the creation of other economic activities.

**Keywords:** Quarries; Local Development; PIER the Codaçal; Territorial planning; compatibility of uses

### **1. INTRODUCTION**

Geological resources are raw materials that come from the earth's crust. They appear due to processes of geological transformation that occur over time. When it is found that their exploitation has a greater economic potential, they become susceptible to being explored, transported and processed.

Law no. 54/2015, of June 22, establishes the bases for the legal regime for disclosure and exploitation of geological resources in the national territory and marine space defined in Article 2, subsection k), mineral deposits, as "any mineral occurrences which, because of their rarity, have a high specific value or importance in the application in industrial processes of the substances contained therein, are of particular economic interest" and in Article 2, subsection n) mineral masses as "any rocks and other minerals that do not have the necessary characteristics to qualify as mineral deposits".

The Territories of the Stone, throughout this dissertation, are defined as the exploration of geological resources referring to the mineral masses or more commonly Quarries, considering that they present particularities considering other spaces, it is justifiable that they are assigned a specific designation.

The general objective of this dissertation is to contribute to the identification of the challenges that the Stone Territories represent for the planning and development of the territory. In order to obtain its operationalization, three specific objectives were adopted: a) description of the technical and scientific approaches dedicated to the territories that are on the influence of the activity of a Quarry (economy, location, impacts and recovery); b) presentation of existing legal guidelines for spaces containing mineral masses; c) to evaluate the relations / conflicts between the interests involved in the mineral masses, by evaluating the role of planning in this process.

In order to reiterate the reflection on what has been presented in the objectives, a key question is asked: "Is it possible to reconcile the mining activity with Local Development, that is to say, is it that the Quarries are an asset to the territories where they belong?".

In terms of methodology, the article is divided into six topics. The first one refers to the introduction where it is explained the subject under study, the objectives and the methodology applied. The second chapter describes the importance of mining activity at a global level, with and as this influence or is influenced by the economy, politics, environment and territory. The third chapter will analyze the relevance at local, regional or national level that mining has in Portugal and what policy is applied in Portugal regarding the exploitation of mineral masses.

The fourth chapter focuses on the relationship that may exist between the Quarries and planning, as well as local development. The fifth characterizes the selected case study: IEA of Codaçal - Serra de Aires and Candeeiros. Finally, the last topic concerns the conclusions that can be drawn from this article.

## **2. The exploitation of the mining masses and the Local development planning**

Mining exploration is an important activity from prehistoric times to the present day, becoming more evident in the First Industrial Revolution that occurred in the late eighteenth century, early nineteenth century, when there was an increase in production in which eventually led to a greater extraction of minerals in order to sustain the growing industry.

Resources end up having an important role in the economy of a country, becoming a lever for its growth. But for this to happen, the state must have stable and democratic characteristics (Lucas, 2007).

In this way, if there is a stable and democratic policy, mineral resources will be a potential for the economy. For this reason, it can be said that a country's policy influences its economy a lot (Badeeb et al, 2017).

In 1995, Sachs and Warner developed an endogenous model that investigated the relationship between the rate of GDP growth during the period 1970-1989 and exports based on natural resources. This study ended up showing *“that economies with a high ratio of natural resource exports to GDP in 1971 (the base year) tended to have low growth rates during the subsequent period 1971-89. This negative relationship holds true even after controlling for variables found to be important for economic growth, such as initial per capita income, trade policy, government efficiency, investment rates, and other variables.”* (p.2).

Studying the relevance of natural resources, it is essential to realize the factors that influence the thesis that abundance in resources leads to proportional economic growth. In this way, the economy and the politics present in these countries are considered two factors. Generally, these are factors that become important to the success of a country that exploits and exports resources. In addition, both are recognized as priorities in the growth and development of any country (Badeeb et al, 2017).

According to Ferranti et al. (2002) the key to success is to complement the abundance of natural resources with knowledge, human capital and good political institutions. For the authors, the mineral exploration activity can become a dynamic sector, strong in knowledge, have a high productivity growth, present relevant interactions in the production chain and propagate technical advances in modern industry. In order to do this, it is necessary that countries concentrate not only on the exploitation of resources, but on their industrialization and the search for new applications for resources exploited.

There are several consequences of mining exploration, and they may be associated with the different stages of an exploration, regardless of its opening location, whether in the soil or subsoil (removal of vegetation, excavation, land movement and modification of the local landscape), in the usage of explosives on the rocks (atmospheric overpressure, vibration of the ground, release of fragments, fumes, gases, dust, noise), transportation and processing of the mineral resource (dust generation and noise), affecting water, soil and air, besides the local population (Bacci, 2016).

The measures taken by quarry operators to minimize environmental risks are "Environmental Impact Assessment (EIA), operating licenses, recovery plans, investments in technically more advanced equipment, noise limit values and new roads to overcome the problems caused by the traffic of heavy vehicles, etc. "(Brodtkom, 2000).

Mineral resources become an economic asset in the territory in which they occur. However, the extractive industry has to compete for space with other activities and land uses, particularly urban expansion, agriculture, environmental preservation areas, among others. In order to solve this problem that can become complex with the existence of various activities and uses of the land around an exploration, it is imperative to have territorial planning through the recognition of their nations (Falé et al., 2006).

So that the extractive sector is not strangled by other sectors, such as tourism, as well as other economic activities, it is vital that a strategic reflection can be recognized in the territory, so that the regions hosting the explorations show a sustainable development, in particular by combining extractive activity with environmental preservation, so that some conflicts between the environment and the extractive activity can be avoided.

### 3. Relevance of mining in Portugal

Resource exploitation can relate to the economy in two ways: on a regional scale influencing the region's economy and contributing to its social cohesion as the main job-creation sector and combating human desertification; and on the national scale contributing directly to the country's Balance of Payments, due to its circulation in a globalized market (Carvalho J., 2010).

Resource exploitation activity may be of vital importance in the economy of "regional, subregional and local, not only do the values in question begin to express some relevance, especially if there is a greater social impact with the presence of locally meaningful employment volumes, either by direct absorption of the sector or indirectly by the dynamics of consumption generated by the income earned by workers and entrepreneurs. (PIER Codaçal, p.227 2013) "

Between 2005 and 2016, International Trade in the Extractive Industry had a positive balance since the value of exports was always higher than the value of imports, not including the values of the exportation of waters nor the values of the import of oil, which allowed Portugal to have a greater gain from exports of mineral resources (Figure 1).

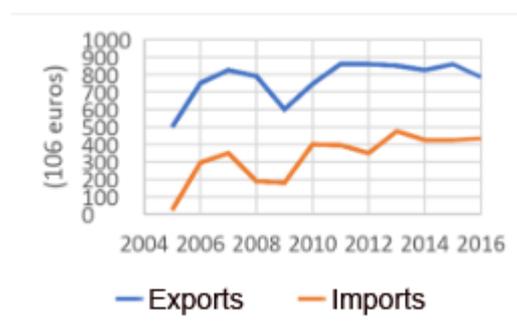


Figure 1 - Evolution of International Trade in Mineral Resources between 2005 and 2016. Source: DGEG

According to DGEG (2017) it is necessary to make a rigorous and differentiated reflection on the exploitation of the geological resources. That is, we must address the different geological resources and the specificity of the market for which they are intended, without forgetting that we

are talking about an activity that produces non-renewable raw materials, which are essential to guarantee economic development and quality of life of the populations, and of great strategic importance for the economy of a country.

Due to the location of this type of resource on land where a rich and exploitable geology can be found, its use can not be conditioned by the constraints imposed by land-use planning instruments (IOT), knowing that its exploitation ends up helping regional development (economic and social) as well as the country itself (Silva Pereira, 2010).

In the last fifteen years, quarrying has undergone a major transformation in the technical and administrative requirements of the licensing processes imposed by the Ministry of Economy, which has launched the Integrated Studies for the Exploration and Landscape Recovery of Quarrying Nuclei in order to balance the restrictions of management plans (PDM) from the 1st generation (which did not prevent the natural expansion of existing quarries), as well as to respond to the environmental issues inherent to this type of activity (DGEG, 2017).

Nowadays, DL no. 340/2007 is the main strategic instrument that tries to meet the objective of bringing illegal explorations to legality, imposing some new rules and introducing corrections to DL no. 270/2001, intending in this way "to adapt the DL no. 270/2001, 6th of October, on the reality of the sector, which will allow the objectives initially proposed to be fulfilled, making possible the necessary balance between the public interests of economic development, on one hand, and protection of the environment, on the other (introduction to DL No. 340/2007).

As such, three main facts become prominent: the first is the creation of a "zero" moment that, for the first time, the State declared and assumed the existence of holdings not titled by license, assigning a term to their businessmen to request the regularization of the quarries that were in this situation; the second is the introduction of a classification for the quarries in classes (1, 2, 3 and 4), differentiating in this way the requirements and obligations of each class; and finally the clarification of some concepts;

#### **4. Relation / Coexistence between the exploitation of mineral masses and the Planning of the local development**

When there is an area of exploitation of mineral masses it is necessary to follow some norms of protection, which according to DL no. 340/2007, October 12, henceforth known as the Law of Quarries, are defined as zones of defense. These are imposed by legislation in order to preserve the limiting properties and other objects.

As it can be seen, the legislation itself tries to safeguard the existence of different types of activities and land uses near a quarry.

According to Felisberto Reigado (2000), planning is a process of analysis of the past, present and of anticipation of the future, programming, action/execution, control, correction and of evaluation

of results. He himself states that the characteristics of major importance in the planning process are: Time, participation and interaction, logical ordering (with flexible character), creation, treatment and exchange of information, learning, maturation and constant unknowns, understanding, finding answers to the doubts that arise.

Thus, when planning to open a quarry it is necessary to have a territorial planning that minimizes the disadvantages and maximizes the advantages in order to create a healthy relation between the exploration and the remaining activities in the surroundings, as well as the different uses of the soil and environment.

Before exploration itself, mineral exploration and research is necessary, these three episodes require a license with different characteristics, a technical license and an administrative license (DGEG, 2017).

Technical issues are related to the recognition. The existence and operating conditions of a particular resource as well as concern for the recovery of the entire area affects the exploration. Administrative matters are intertwined with legislative norms, with emphasis on the ownership of the land, as previously mentioned, as exploitation of mineral masses is a private domain, as is land use planning and the environment.

The published legislation has been scarce with respect to the protection of resources, not overlapping those of planning and environment. As such, the use of a resource is conditioned by the overcoming or conditioning of some limitations of a political scope.

In Portugal, any action that is intended to be carried out on a site requires the emission of an authorization, and the conditioning factors become essential tools for decision-making and space planning. In the case of the exploitation of mineral masses, the most important planning constraints are: the Regional Plan for Territorial Planning (PROT), the Municipal Master Plan (PDM), the Detail Plan (PP), the Protected Area Management Plan, National Agricultural Reserve (RAN), National Ecological Reserve (REN), Natura Network 2000, Cultural Heritage, Water Domain, Captive Areas, Reserve Areas, as well as other specific conditions.

There are several problems that occur when a farm is closed down or abandoned, but what causes the greatest visible impact on the land is the crater that is left open on the ground due to the extraction of the material from the inerts. There are other impacts, including environmental impacts. In order to minimize these impacts, there is in the Portuguese legislation the Decree of Law no. 340/2003, October 12th, which creates the obligation to create an Environmental and Landscape Recovery Plan (PARP) when the Quarries Plan is presented.

PARP's objective is to rehabilitate the areas in the territory where the exploitation took place, as well as its supporting infrastructures such as annexes, waste disposal areas, accesses, etc., taking into account its location, characteristics and framing of the areas to be recovered. This plan is presented on a scale of 1:2000 or higher and is supported by pieces drawn, such as plants and

cuts, as well as by 3D graphic schemes, that allow to anticipate the development of the works during the life of the quarry.

### 5. Codaçal’s Specific Intervention Area: A case study

The under study is classified as a rural area and is part of Codaçal’s IEA, located within the Natural Park of Serra de Aires and Candeeiros and belongs to the district of Leiria, municipality of Porto de Mós and parish of Serro Ventoso.

Taking into consideration that it is identified as an IEA, it is an area subject to extractive exploitation, created in the Ornament Plan for the Natural Park of Serra de Aires and Candeeiros (POPNSAC) and aims at establishing compatibility measures between the rational management of mineral extraction, recovery of degraded areas and conservation of the natural heritage taking into account the values and the landscape and environmental sensitivity of the surrounding area, and being subject to special protection regimes. (PIER Codaçal, 2013)

For the area under study, the IGT, binding to the individuals are the PDM of Porto de Mós and POPNSAC.

Taking into account the regulatory provisions of the POPNSAC, the IEA “*should be subject to the elaboration of Municipal Territorial Planning, aiming at establishing measures to ensure compatibility between the rational management of the extraction of mineral masses, the recovery of degraded areas and the conservation of the existing natural heritage taking into account the values and sensitivity of the landscape and environmental aspects of the surrounding area*” (PIER Codaçal, p.2, 2013)

The municipality of Porto de Mós started the first review of the PDM in 2015, during which it carried out an evaluation report on the current PDM. In relation to existing and proposed mineral land exploration areas, these are found in Rural Soil identified in the Land Classification and Qualification Plan as Exploration Spaces of Geological Resources (Figure 2).

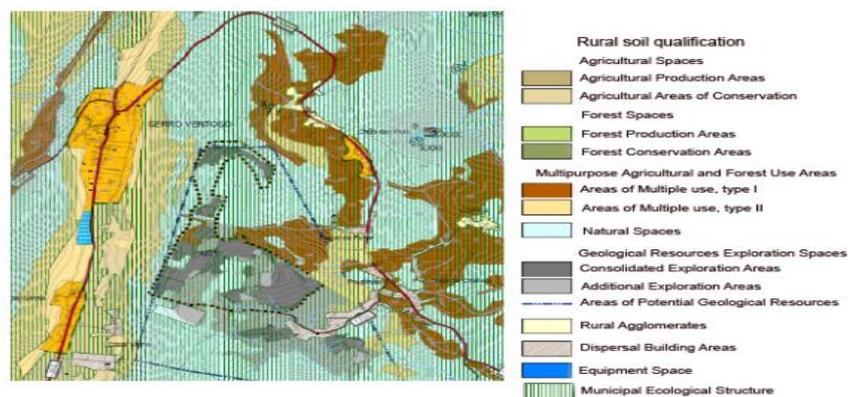


Figure 2 - Classification and Qualification of the Soil Plan of the PDM of Porto de Mós, in the study area.

According to the PDM regulation in section VI, this defines the areas that integrate Geological Resources Exploration Spaces such as:

- **Consolidated Exploration Areas** – “spaces where there is productive activity of exploitation of mineral masses, with intensive exploitation, in the face of the recognized interest in terms of the existence of the geological resource.”
- **Complementary Areas of Exploration** – “areas with geological resources already identified that correspond to the priority areas for expansion of legally existing exploration sites and the installation of new farms in the face of the recognized interest in terms of the existence of the geological resource and its importance in the context of the regional economy.”
- **Potential Geological Resource Areas** – “areas where there is existence of geological resources whose exploitation is feasible whenever allowed in the category of space covered.”

With regard to the protection regimes provided for in the POPNSAC, in Article 11 of the POPNSAC regulation, regarding the Codaçal IEA, the following are identified: Partial type I protection areas; Partial type II protection areas (Figure 3).

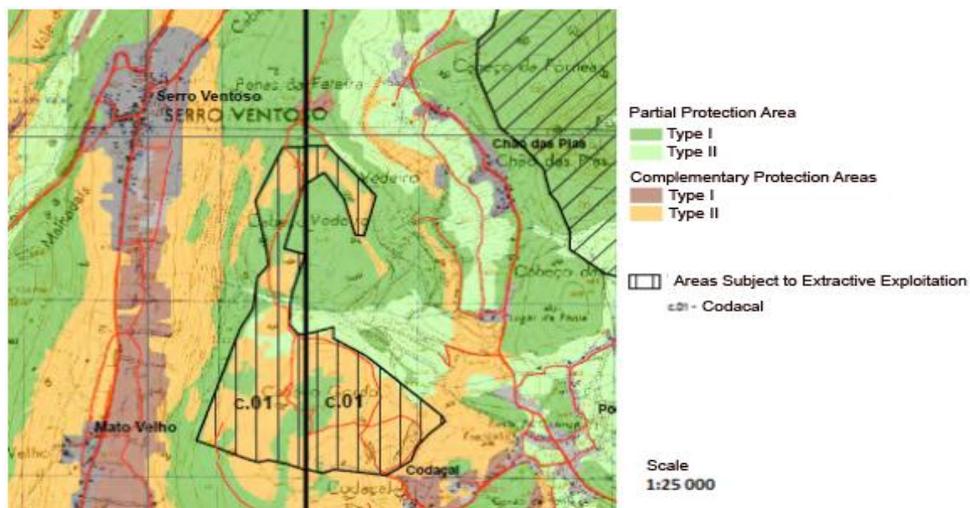


Figure 3 - POPNSAC Ordinance Plan, relative to EIA Codaçal. Source: POPNSAC

In areas of type I protection, according to Article 13, it is prohibited “the establishment and expansion of holdings of mineral masses, without prejudice to Article 32 (1) and Article 37 (2). (Applications for the licensing, expansion or adaptation, of holdings of mineral masses submitted before the date of entry into force of this Regulation, which have the favorable opinion of ICNB, IP). ”

In the partial protection areas of type II, Article 15, no. 1 prohibits “the establishment of holdings for the extraction of mineral masses, without prejudice to no. 3”, is stipulated that “the expansion of holdings of mineral masses in the partial protection areas of type II shall comply with the

*provisions of Article 32.* For such areas, extensions of holdings may be authorized if *“the recovery of degraded area of the same holding with double the size intended for expansion”*.

Taking into account the interviews conducted with the President of the Town Council of Serro Ventoso, as well as the population that lives in the area, and that are directly or indirectly linked to the stone exploration activity, they have a positive opinion about the Quarries, considering them as an added value for Local Development, presenting no objection to their existence.

In general, during my trip to the area, as well as during the recognition of the town, the Quarries end up unnoticed, being only visible in certain places. However the activities indirectly linked to the exploration, as the manufacturing or sale of exploited materials, are much more noticeable in the territory.

As such, I conclude that the town chosen as a case study, as well as the surrounding area is very dependent on the activity of exploration of Stone, considering this an added value for the territory and its development.

## **6. Conclusions**

In Portugal, this activity has assumed an important role in the local, regional and subregional economy, creating employment in a direct and indirect way, which generates consumption dynamics, allowing the economy to move. The same was observed in the study area through interviews, which referred to the Quarries as important activities for the local economy.

Regarding the question asked: "Could it be possible to reconcile the extractive activity of mineral masses with Local Development, that is to say, is it that the Quarries are an added value for the territories in which they are inserted?", I can say that in a general way, yes, they are. Considering the data collected in economic terms (employment and exports) and the analysis obtained during the visit to the Town of Serro Ventoso, however, although it is also necessary to take into account also the impacts that this type of activity causes in the territory.

Although the specific objectives set out at the beginning of the article have been achieved, as well as the overall objective, which identified environmental issues as the greatest challenge that the Stone Territories poses for planning and development. It is necessary to assume the limitations and difficulties experienced during the realization of this article, namely the lightness with which some subjects were dealt with; having the notion that a deepening of the same ones would be necessary; the difficulty in obtaining more specific and recent data, which could be important for the more reliable contextualisation of the mining activity and its impact on the development of the territory.

Finalizing this article with the idea that Stone Territories can and should be observed as potential opportunities for the Local Development while keeping in mind the indications of the Territorial Management Instruments (IGT) that refer to those areas. It would also be important, and even a

necessity to create and maintain an active dialog pertaining the perspective of environmental and social issues, along with the territorial planning between businessmen, the population and government entities, as to correct and improve the relation between exploration of mineral masses and the territories that they are in.

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