



THE GEOLOGICAL WORKSHOP OF GEODESIGN FOR LANDSCAPE PLANNING

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ABSTRACT

Geology has always been present in the process of transformation of the anthropic landscape. However, the role of Geology in landscape planning is still incipient and has not been the subject of an integrated policy. Linked to this and to the need of professionals related to Geology and Mining to participate actively in planning, the Geodesign technique was chosen to elaborate an alternative future plan for the Iron Quadrangle region, in Minas Gerais, Brazil, using Geology as base.

In this way, a Geodesign Workshop was held with several professionals related to Mining and obtained a territorial plan for the region. This result generated the Decision Model, which is consistent with the study area and showed that the method used is assertive for landscape and territory planning.

KEYWORDS

Geoprocessing; Geodesign; Geology; Landscape Planning; Territorial Planning

1 INTRODUCTION

The present work represents geology as a tool for territorial planning, based on geological-related issues and using the Geodesign Framework to find solutions to the conflicts in the area. The great importance of the geological processes, which can explain the forms of occupation of the territory from the beginning, influencing its evolution and the processes of transformation of the landscape, is highlighted. The decision by the area of work as the Quadrilátero Ferrífero was motivated by the fact that this region is local of the most diverse interests-social, environmental and economic. The mountains that connect from Rio de Janeiro to the Quadrilátero Ferrífero form an alignment of peaks, which served as a reference for the pioneers in the interiorization of the Brazilian territory. This geological influence was the main guide for the first Brazilians who went to Brazil to explore and also to search for precious metals. After all, these pioneers imagined that due to the alignment of this region with Potosi - Bolivia (Machado, 2009), where the Spaniards were already mining, they would be able to do the same in Brazilian lands. Being a visual guide for the explorers, the geological features and their geomorphological consequences led and influenced the beginning of the urbanization of the interior of Brazil. The beginning of the internationalization history of Brazil has embryonic connections to geology and geomorphology. This relationship can be observed in the reflection of Paraizo (2004) with Machado (2009), "a knowledge about the formative processes of our planet and its evolution in time," which served as a guide for man since the beginning of its history. The development of the geological processes together with the geomorphological processes model the terrain in a primary and secondary form, acting in a constant way. These events have long temporal spaces, practically unassimilable for human perception. Therefore, from the beginning of human presence on Earth, the terrain model is practically the same, and man himself is the greatest modifier of the same. These man-made modifications have generated the most diverse conflicts of interest, whether economic or environmental. In this way, observing this current context, it was decided to carry out the Geodesign procedure to create possibilities of alternative futures in relation to the study area. The Framework used in the area is shown as an interesting logical structure to discuss the territory. In view of the above, the proposal of this work is to discuss the potential of Geodesign to characterize the discussion of conflicts of interest in landscape management, using the case study carried out in the Quadrilátero Ferrífero area (Fig. 2). Recent works cite the transformation in the landscape directly related to industrialization, which, in the case of the study area, is mining (Sonter, 2013; Sonter, 2014). Just as the occupation of the territory is directly related to the economic use, because it was the presence of mineral deposits that conditioned the colonization of the region by the Portuguese at the end of the XVII century (Roja, 2014; Sanches, 2012). In parallel with the economic interest, environmental interest also happens, which generates spatial conflicts, as there is overlap and juxtaposition of interests between the parties that work in this space. It is also observed that the area is urban growth, since it corresponds to the south vector of the Metropolitan Region of Belo Horizonte (Tonucci Filho, 2012). In the study area, there are expressive compositions of the three main sectors mentioned above (mineral sector, urban and environmental planning) (Roja, 2014; Souza, 2007). As a result, there are environmental and territorial conflicts in the Quadrilátero Ferrífero, related to the different interests of the use of the territory and its evolution linked to hegemonic agents (Silva, 2007; Souza, 2007). The Quadrilátero Ferrífero was chosen as a study area due to its importance in the context of the State of Minas Gerais. This region brings together a great variety and richness of natural elements, in which the economy of the State of Minas Gerais is inserted, with mining as an economic symbol. The region is located in the center-southeast portion of the state and occupies an area of approximately 7,000 sq km. The taxonomic origin of the region was named by

Gonzaga de Campos (Dorr, 1969; Ruchkys, 2007; Scliar, 1992), due to the iron ore deposits found there, located at extreme locations in the municipalities of Itabira, Mariana, Congonhas and Itaúna, which are geographically arranged quadrangular in the territory in question (Fig. 2). The region has many mineral resources, being one of the two main mining provinces of the country. In addition, there are a wide range of other relevant factors such as the local landscape, type of vegetation that occurs only in this area, source of important rivers in the formation of the regional and national water network (Silva, 2007). It is also observed a significant quantity of patrimonial assets, due to their occupation by the colonizers in the phase of historical importance of formation of the Brazilian society.

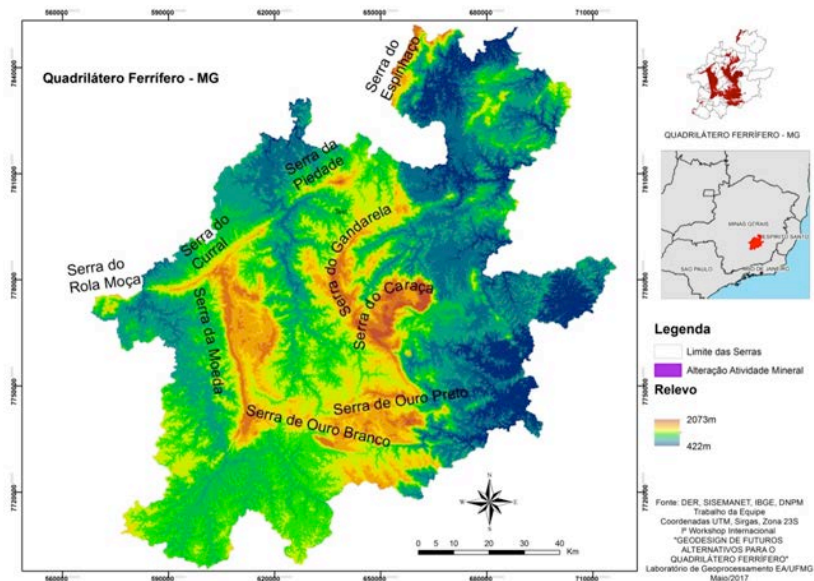


Fig. 1 Quadrilátero Ferrífero area. Source: authored by the author

Understanding the values of the Quadrilátero Ferrífero is much more difficult than imagined, since it makes the understanding of urban occupation and expansion conflicting with landscape conservation and mining activity. Because it is an area delimited by saws and of great environmental, mineral and geological representativeness, and being located the capital of the state to the north of the Serra do Curral, the mountains act as the main limiting factors for an easy integration of the region (Conti, 2009). Being surrounded, from north to south and west to east (Fig. 3), by the mountain range of Serra Azul, Serra do Rola Moça, Serra do Curral and Serra da Piedade (north flank); Serra da Moeda (west flank); Serra de Ouro Branco and Serra de Ouro Preto (South flank); Serra do Caraça and Serra do Gandarela (east flank) (Dorr, 1969).

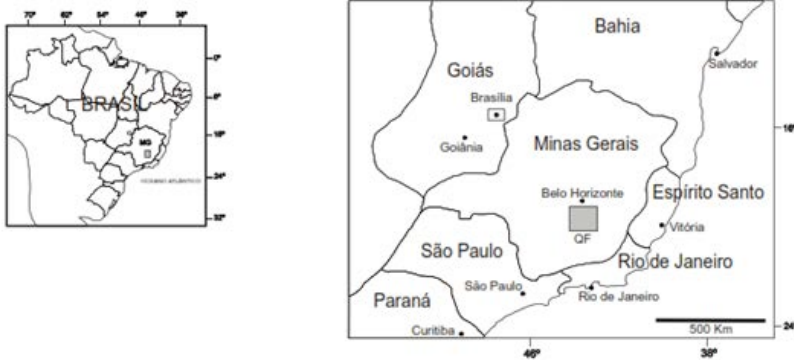


Fig. 2 Location of the Quadrilátero Ferrífero (Source: Ruchkys, 2009)

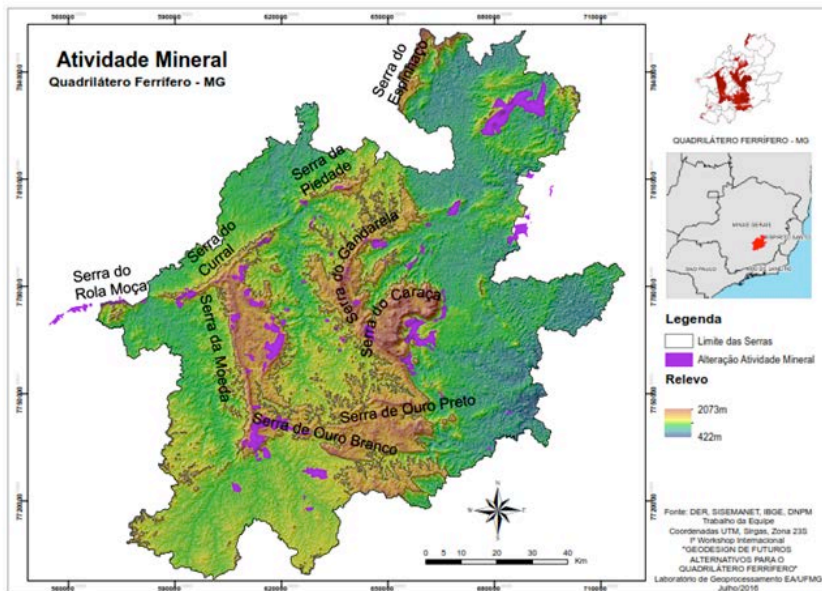


Fig. 3 Mountain range around the Quadrilátero Ferrífero. Source: authored by the author

2 OBJECTIVE

What is wanted is a review of the geologist's position regarding the possibility of experience a shared project and make it a legacy to the profession. That he may participate in projects in which there is co-creation and sharing of decision making, being part of the collective decisions of the society, in which, usually, this professional is left and left out. And let the Geologist listen and be heard by other professionals, in focus geological or not, so that there may be a greater interaction of work and that there is compatibility among

related areas. Thus there is a need to understand the role of this professional as an important part of planning and open possibilities for the geologist to act in these processes. To the point where compatibility is the basis of the methodological process used in this work, and in turn is the methodological basis of Geodesign, developed by Carl Steinitz in 2012.

3 GEODESIGN FRAMEWORK

Carl Steinitz (2012) defined Geodesign as "a tool based on a set of questions and methods necessary to solve large, complicated and significant design problems at various geographical scales, ranging from a neighborhood to a city, landscape or basin hydrographic ". Geodesign can also be defined as an integrated process, undermined by the assessment of environmental sustainability, aimed at solving complex problems related to environmental and territorial issues and directly linked to social and economic issues (Dangermond, 2010). The practice of this technique requires the collaboration of several professions (Fig. 4), among them, environmental design, geographic sciences, information technology and local people (Steinitz, 2012).

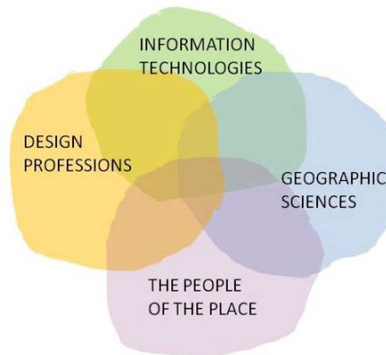


Fig. 4 Geodesign Framework. Source: STEINITZ, 2012

Once the technical team is formed, the initial questioning stage begins, present in the first iteration (Fig. 5), which are composed of six questions:

- How should the study area be described?
- How does the study area operate?
- Is the current study area working well?
- How might the study area be altered?
- What differences might the changes cause?
- How should the study area be changed?

After this initial stage, the preparation, implementation and conduction of the six models proposed by Carl Steinitz (2012) will begin: Representation Model, Process Model, Evaluation Model, Change Model, Impact Model and Decision Model.

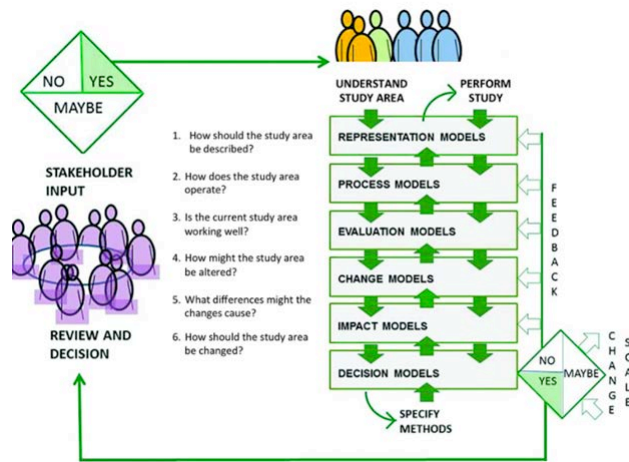


Fig. 5 Geodesign Framework. Source: STEINITZ, 2012

4 CONCLUSION. THE GEOLOGIST AS PART OF THE LANDSCAPE PLANNING AND COLLABORATIVE PROJECTS

Nowadays, it is widely held that decisions must be taken by multidisciplinary teams and with the involvement of all sectors of the society, a guideline present in the Constitution of the Federative Republic of 1988, reaffirmed for the urban scale in the 2001 Statute of the City. occurs at a certain level within the Government, but the geologist's are not so embedded in these processes of collective discussion.

Geology is the basis of society, since virtually everything that is built on the continents and these are supported by the rocks, being such science the pillar for the sustentation of the anthropic activities. Consequently, the geologist has space to participate in collective decision-making, being the professional who understands the endogenous dynamics of the planet.

This profession thus encompasses much more than is done by (mining and geological mapping are the main attributions of the professional who is in the market). Specifically on the area of study of the present study, it is necessary to understand how important the geologist is to the studies of the region, and that he should be one of the main planning agents for the Quadrilátero Ferrífero, since virtually all aspects of this territory have strong links with the issues of the geological features.

Geology strongly influences the landscape and its values to be conservation, environmental and economic riches, the expansions of anthropization by mineral explorations and by expressive urban growth and the essence of genius loci of the place, which is the mining landscape.

Therefore, this work has two main factors: research on the potential of the Geodesign Framework and the discussion on the potential of insertion of the geologist in the collective decision-making about future of a landscape.

It is important to state that, (i) by means of the Geodesign for planning, if you have obtained a final product consistent with the realistic and enforceable; and (ii) the representativeness of the geologist for the preparation of co-creation projects and for decision-making should be respected and taken into account.

Finally, it is advisable to record the new contemporary values in landscape planning and management processes, viewed as collective goods, which consider the shared decision. In this sense, the Geodesign method (draw "with" and "for" the territory - geo + design) is a positive exponent. There is space for all social actors and all professions linked to change and modification of the landscape in this process. Therefore, the discussions here presented may be continued by professionals involved in territorial transformation and by the Public Power, aiming at solving present in territories with conflicts of interest.

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