

## LANDSCAPE ANALYSIS OF THE TOP COURSE OF JAIBARAS RIVER HYDROGRAPHIC SUB-BASIN: IBIAPABA PLATEAU AND IN ROSÁRIO SIERRA

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### **Abstract**

*Jaibas river hydrographical sub-basin is a tributary with a high potentiality in the left bank of the main river, Acaraú. It drains nine municipalities and delivers multiple uses of its water to the people who depend of it. The area considered in this essay is the one on the top course of Jaibas river hydrographical sub-basin, which covers the cities of São Benedito and Guaraciaba do Norte (in Ibiapaba plateau) and the district of Jordão in Rosário sierra, place this that belongs to Sobral. On both top courses, three tributaries in Ibiapaba plateau were visited and one of them is in Rosário sierra, in the district of Jordão. The methodology used to produce this work was based on field trips directed to the achievement of records, what along with the geosystemic method, made possible to understand the relation of the humans' role regarding the modification in landscapes on the top courses, which consequently influences along the course of Jaibas River hydrographical sub-basin.*

**Keywords:** *Landscape, Tourism, Hydrographical sub-basin.*

### **Introduction**

Jaibas river hydrographical sub-basin is a tributary on the left bank that belongs to the basin of Acaraú river. It drains nine municipalities distributed along different subdivisions, namely massif, plateau and hinterland depression.

Faced to those feature components, landscape distinguishes by both perception and man's historical action in the environment. Changes in landscapes have an influence not only on the eyesight, but also on the behavior of elements that make it up.

In order to develop this work, it was sought to analyze Jaibas river top course landscape taking into account the judgments contained in Bertrand's geosystemic method [1] [2] and the perception of dynamic landscapes present on both top courses in the considered sub-basin. The analyzed area is located in two elevated spots, which correspond to both top courses of Jaibas river hydrographical sub-basin: Ibiapaba plateau and Rosário Sierra.

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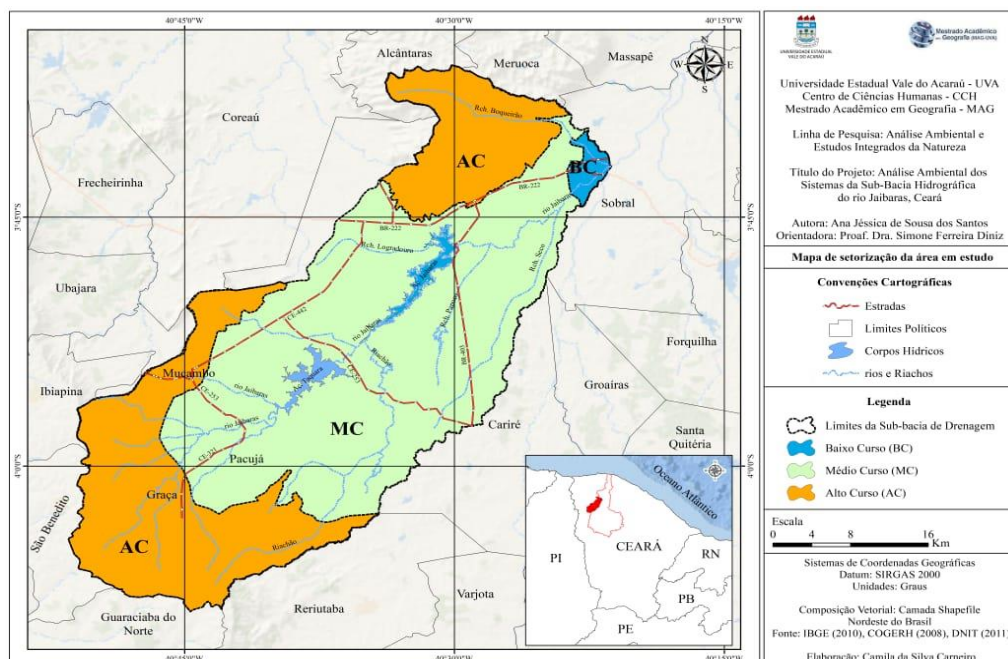
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Ibiapaba plateau morpho-sculpture is the result of two relations that wrap shearing zones, stratification models and the resistance degree of rocks, what jointly represent the structures that sustain or control such plateau [3, 4].

Rosário Sierra structural conditions are tied by the existence of Boqueirão creek valley, which in turns, divides the massif of Meruoca in two parts: North Meruoca and Rosário Sierra [5, 6].

**Studied area location**

Jaibaras river hydrographical sub-basin is placed in the northern part of Ceará, about 257 km from Fortaleza and covers an area of 1.567km<sup>2</sup> set among the coordinates 4°08’50,13’’ and 3°35’41,96’’ South Latitude and 40°51’40,51’’ and 40°21’09,92’’ West Longitude. Such sub-basin is quite relevant to Acaraú river hydrographical basin due to its landscape potentiality and peculiarity (Fig. 1).



**Fig. 1.** Studied area

**Material and Methods**

With the purpose of producing this work, firstly, a bibliographic review was extremely necessary to systematize some information. For a better data synthesizing, fieldwork was essential to bind theory and practice. Having both theoretical and practice data, it was analyzed (i) the composition dynamic of landscape over different morpho-structural domains, (ii) human influence over landscape and (iii) the touristic activities development in areas of affluent.

Based on Bertrand’s geosystemic method [1], this research tries to identify – through social and natural relations – that the landscape composition in the top courses and the influences suffered in areas of tributaries are consequences not only of the relationship between humans and the environment, but mainly of the natural process of features disposal.

## Results and discussion

### *Landscape composition in areas of affluent*

In the Brazilian Northeast development history, there has been a pursuit for better life conditions to survive in semi-arid areas. Resources have been exploited for human's survival (and, in time, this exclusive level has been left behind), man has now exploited water courses [7].

Landscape addresses the viewer's impression over the environment and the composition of its formation. As stated by *C.O. Sauer* [8], landscape would be a rupture of the natural to build the cultural. Amid the two dilemmas (natural and cultural), it is found the formation of a multiple and unique environment in where man is assumed to act on it, but he receives as answer, the result of its actions.

Our studied area covers those affluent in both top courses. The first in Ibiapaba (plateau), or to be more specific, in the municipalities of São Benedito and in Guaraciaba do Norte, and the second in Rosário sierra.

In Ibiapaba plateau, São Benedito and Guaraciaba do Norte, landscape behaves as dense tree caatinga enclaves [9]. Regarding soils, Neosol stands out as the most present, the same rocky material found in Serra Grande (Big Sierra) under the interference of humid tropical climate.

With respect to the formation of Rosário Sierra, it presents the same material as in the massif of Meruoca, arising from the crystalline. The composition of landscape by environmental elements shows that soil in that area is primarily the Acrisol, under the domain of Meruoca granite plutons and the massive presence of a pluvial-tropical sub deciduous forest [9]. Geographically, since Rosário Sierra is located on the other side of Meruoca Sierra, in the leeward region, the climate is set as warm tropical semi-arid.

### *Tributaries areas in Ibiapaba plateau*

In São Benedito, the source of Mata Fresca and Pinga Waterfalls was visited, being both of them bordered by the municipality of Graça.

Pinga Waterfall has its birth directly in a sedimentary rock. In conformity with figure 2, it is possible to see the birth spot with the aid of a makeshift extension (bamboo).

That area is rarely frequented by people due to being difficult to access. It does not present a large volume flow, having a diameter of about 25mm.

Mata Fresca Waterfall, still in São Benedito, is different from Pinga since it receives a large number of tourists. The area where it is born is in an environment full of roots. Its water course is perennial, however, there is kind of a containment area which promotes leisure attractions.

Mata Fresca Waterfall, besides having an impressive natural view that contributes to rappelling activities and other extreme sports, it is also an environment favorable to touristic leisure.

Due to a non-affordable path to the waterfall, considering the long distance and the terrain impossible for the passage of vehicles, there is nothing more than extreme sports practices and leisure activities, not even commerce.

In Figure 3, it is pictured an overview of the top of Mata Fresca Waterfall. In this landscape, the hinterland depression reveals irregularities in lower lands aspects [10]



**Fig. 2.** Pinga Waterfall birth spot



**Fig. 3.** Mata Fresca Waterfall overview



**Fig. 4.** Cigarra Creek's affluent area



The source of Cigarra Creek, in Guaraciaba do Norte, is often used for leisure activities and hunting. The access path to that creek's source is not that easy due to the dense vegetation and the steep terrain.

In figure 4, it is observed the area of the Cigarra creek's tributary, where human interference on the environment is clearly evident with hunting and leisure practices.

***Affluent area in Rosário Sierra***

Rosário Sierra is composed by three districts (Jordão, São Francisco and Baracho), all of those places belonging to Sobral. A field trip was made to Jordão creeks affluent in the district of Jordão. That area is featured by path areas and is visited by its dwellers that practice predatory hunting.

In figure 5, it is noticed that the affluent area is not used for leisure, since besides being in a rainy period, the water course has a volume equivalent to a thread.



Fig. 5. Jordão River affluent area

***Tourism: A social practice that impacts landscape***

Space is a social product. Space production happens every day. According scientific literature, the living of man is to produce space [11]. Therefore, reality is in constant transformation.

The relation between tourism and space is inherent in the capacity to reorganize territories to suit already existent conditions and create new ones in benefit of touristic activities. By the other hand, space production must not be characterized only by the insertion of apparatus that directly have to do with tourism, but also by elements that, in an indirect way, deliver a basis to such activity's development [12].

Tourism presents dynamism of relations that may surpass political borders of a certain place. As a matter of fact, there are no borders in tourism.

Tourism is a quite wide activity. It is not possible to understand it only as the tourist (the aggressor agent), who appropriates natural spaces through a reshape of nature, and speculations

in respect of the touristic spot as only a tool to attract a great flow of people who represent capital circulation [13].

According *R. Bertonecello* [14], traditional concepts focus on describing touristic spots in terms of their different characteristics: attractions, equipment, and territorial configuration. Studies towards tourism focus on analyzing it as an economic activity, or as a social practice in a strict sense. Such traditions, when joined, has led to a treatment of tourism as an exceptional phenomenon, largely out of the social order context, to which comprehension it could hardly contribute, and the touristic territory as a mere place where it happens [14].

Thus, tourism involves the junction of processes that induce trips, the ones that deliver a support so such trips may happen and the ones that allow them to happen. In reality, tourism comprises social processes that make its reproduction viable. Thus, there is no tourism without tourists since a place just get evidenced after the tourist's admission in the environment [15].

However, when treating a natural environment as a touristic potential, it must be given to it infrastructural support to develop people/capital circulation in such environment. The natural environment is not the primary factor in which tourism may be accomplished. Instead, it is a joining of elements that favor the realization of tourism.

This way, tourism imposes new social relations in places and materializes itself in the territory [12]. Hence, this space adequation creates a system prone to social action. As evidence of this, tourism is motivated by the landscape desired by tourists. Moreover, each landscape has a unique view which and posteriorly is turned into a new landscape.

Tourism activities assemble factors that motivate and move new visitors to a local. One of the many tools "sold" in tourism is "natural" landscapes. Such sold landscapes work like an enabler to new touristic practices.

Furthermore, tourism may be branched according to the desired object, destine and practice. In the studied area, the practice of tourism is more evident by a natural booster (waterfall) to what is called adventure tourism activities [16, 17], rappelling in special, what is frequently practiced in areas of tributaries.

In areas of tributaries in Rosário Sierra, the most common activity is leisure visitation, what is not considered to be a tourism practice since it does not aggregate independent factors as hotel business, commerce and natural attraction regarding those sold landscapes.

## Conclusion

The space in face of development of tourism relations in tributary areas cannot comprehend it on its own, but also by understanding the reality. Modifications that such areas have undergone in reason of tourism have boosted the environmental deterioration process.

The landscape analysis of the top course of Jaibaras River hydrographic sub-basin presented peculiarities and divergences from both the composition by the origin material and the presence of activities that deliver touristic attractions.

In Rosário Sierra, landscapes have not suffered so much human intervention since it does not promote or attract the modifying agent (man) by not providing advantages to exploit its environment.

The visited area of affluent in Ibiapaba Plateau, Mata Fresca Waterfall, meets some requirements that facilitate tourism either for leisure or extreme sport (rappelling). Another positive factor in this area is the overview from the top of the waterfall, which offers to the viewer, the power of expanding his sight range.

Nevertheless, there has been harm alongside those mentioned benefits. Although there is no natural landscape anymore, landscapes without so much human interference exists by itself, but by having interference, it has been modified according to imposed necessities.

Therefore, tourism is an extremely profitable activity. Landscapes which are sold end up being the external ones at the expense of the internal ones. Tourists, who are actually authors of modifying techniques, are in a position to define and choose the best options that please them. On the other hand, the market is time after time adjusting touristic environments to promote and motivate even more visitors. With that, the time which has once been modified, ends up as a “dead” time giving place to a “living” time [11].

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