

EROSIVE PROCESSES AT BACANGA STATE PARK AREA

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INTRODUCTION

The conservation measures of the areas reached by irrational way of exploration were adopted in the attempt to preserve the Brazilian ecosystems. There are many Conservation Units, where (theoretically) the nature has larger possibilities to resist the human aggressions. In Maranhão there are 10 Conservation Units, two Federal ones and 8 State ones. The state park of Bacanga, which is the object of this work, is a State Conservation Unit located in Maranhão Island founded in 1980 and its objective is to preserve the flora, the fauna and the local springs.

Despite the importance of the local ecosystem and the supervision of the responsible institutions, the real predatory actions in the area reflect the lack of ecologic conscience from who attacks the Nature extracting in a criminal way its natural resources.

The environment degradation is evident when the erosive processes intensified by the human activities are observed in the local like: removal of the vegetation, the use of the agricultural practice, the urbanism, among others. Those accelerated erosive processes have reached specially the geomorphology of the Park. The silting of the river, the gullies and ravines have standed out in this sceneny of degradation of the soils.

This work deals with enviromental problems caused by the human interference that influence directly in the equilibrium of local ecosystem.

METHODOLOGY

The adopted method for the elaboration of this work was the Deductive, because it establishes, from the forms, tipic models that comes from the activities of morphogenetic agents.

The methodologic proceedings adopted are the following:

- Survey and analysis of bibliographic and cartographic material, through monographs and other documents that have information about the park for better comprehension of the area;
- Visiting to the Bacanga State Park, observing the characteristics of the environment based on environmental perception;
- Data collection relative to the environment climatic characteristics, with the help of precision devices, like a thermometer used to measure the temperature and humidity of the air and the other used to measure the temperature of the soil.
- Interpretation and analysis of the data obtained in the anterior steps.

GEOGRAPHIC LOCALIZATION

The Bacanga State Park founded in 1980, is in center west of *Maranhão* Island, in a area approximately 3.000 hectare. The geographic coordenates that delimit the area are the parallels 2°32'30" and 2°37'30" south latitude and meridians 44°15'00" and 44°18'44" west longitude .

The park is bounded to the north with *Pindorama* park, *Timbira* park, *Coroadinho* and *Sacavém*; to south with Industrial District areas of *São Luís*; to east with *Santo Antonio* and *Tirirical* neighborhood and the west with the *Vila Maranhão* and *Vale do Rio Doce* Company. (MARANHÃO, 1991)

RESULT AND DISCUSSION

Physical aspects of the area

The physical main characteristics of Bacanga State Park are the following: geologically is in Coastal Sedimentary Basin of *São Luís*, its soil is composed by own material from this kind of structure like not consolidated sandstone and *argilito* that date from Tertiary. (IBGE, 1984); the relief is classified as plain, only in more central areas of the park there are some hills and valleys, which have modest altitudes, compose themselves of low tabular forms and dissected surface; the pedology is marked by the presence of *lacteritic* soil

and low natural fertility, in general, formed from the *intemperization* and erosion process that reach the entire area, being the soil kind of *podosolo* (dark color, present in depression zones), alluvion (gravels, sands and not consolidated dark mud) and salines (highly activated made of argillaceous sediments like *caolinitas*, *ilitas* and *montimosilitas*); the predominant climate in the area is the hot and humid kind of tropical; about the vegetal cover stands out the mangrove and wood or *Igapó* (due to great number of trees and the humidity of the area respectively); the hydric resources of the park are abundants, being found springs (which supply some neighborhood of *São Luís*) and sub-basins (which are spread in the area, among them: *Bicas* river, *Coelho* stream, *Batatã* dam; High *Bacanga*) (MARANHÃO, 1991).

Environmental problems resulting from anthropic actions

The area of Bacanga has already suffered predatory actions before the criation of Conservation Unity, some own government works contributed for the anthropic invasion of the park, like: the construction of BR-135 and *Franceses* and *Africanos* avenues, enabling the access to the area, forming neighborhoods of middle class, facilities (storehouse, workshops and others) and, mainly, disordered occupations. In the last years the limits of the park were changed many times, due to the human presence that modify the natural condition of the environment with the construction of housing development.

Thanks this fact, there was the necessity of a delimitation more coherent with the preservated area. Since 1984 the Park limits were reduced successively for the settlement of poor families. The last legal redution, that it was known, it was the exclusion of 18.000 m² for the implantation of a physical unity for helping people, in June 1992.

On the one hand, the successive delimitations mentioned show the difficulties for keeping a Conservation Unit in urbane enviroment. The attempts to the occupation of the area do not cease. The signs of human presence are visibles not only around the park, but also in its interior, evidenced by the illicit removal of stone, clay and wood. On the other hand, they reflect the negligence of the competent intuition in controlling and in the adequated use of the environment considering the social wellbeing.

The urbane occupations, that appeared in this area, required urbane infrastructure like: public and residential illumination, and asphaltic pavement and other services, which impede the recuperation of the degraded spaces because many activities are developed in the area, some resulting in small damage and others much more significative with a great impact. In the

area of old extraction of stones for commercialization, with the use of machinery, there is the difficulty to recuperate the Nature. The existent inspection does not inhibit the devastating action that occurs in the local and it is insufficient to protect it.

Erosive agents and processes

The geomorphology has deepened the study of the evolution of erosive features, because the earthy relief that is sculptured and the processes that are initiated are the study object of this science. The erosion of the soils is a natural process, whose intensity depends on natural factors like composition of the soil, lithology, climate and declivity of the soil (in the area in studying the declivity is around 40°), among others. However, the human action can accelerate this process, acting as agent that modifies the landscape. Among the causes of erosion are the deforestation and posterior use of the soil for diverse purposes, like agriculture, cattle breeding, mining, and urbanization.

The erosion of the soils is related with many agents and geomorphologic processes, which can be physical, chemical and biologic and can be in an individual or collective way, in different temporal and spacial scales. Among the agents are: climatic, hydrographic, biotic and anthropic action that causes degradation. These agents are observed in the area in studying transforming the morphology of the environment in an intense way (MENDONÇA, 2003).

In Bacanga Park, the accelerated erosive processes are observed, as the result of human intervention with the construction of the roads and of Batatã dum, which enable the erosion of the borders, the posterior silting of the rivers of the park and the appearance of ravines and gullies.

Ravines and gullies result from the tendency of the natural system to reach an equilibrium state between available energy and efficiency of the system to dissipate energy. The ravine process starts with the superficial leakage of water that was not infiltrated in soil, in other words, when the soil is saturated by rain water that go down the slopes provoking the opening of small channels, the embryos of new ravines that due to the strength of their flux provoke an intense erosion extending the rugosity in the deep of the channels deepening and enlarging forming a gully. (GUERRA, 1999)

The ravines and gullies are distinguished, in this work, by dimensional character, because ravines incisions are about 50 centimeters of width and depth and gullies incisions

are superior (OLIVEIRA, 1999).

The removal of vegetal cover of the park for lucrative purpose contradicts the principal objective of the existence of an environmental reserve – the conservation and maintenance of the nature. In consequence of the deforestation and extraction of stones in the area theoretically under protection, many problems (like erosion and silting) have been intensified threatening the future existence of the reserve.

FINAL CONSIDERATION

In this study, it was observed that the problems that achieve the *Bacanga* State Park continue to cause damages to its environment, besides the foundation of the Conservation Unity.

The lack of inspection more intense enables the human occupation in the area, which can be reduced with more patrol through the increase of police officers in the local and distribution in stations near the neighborhoods, because there is only a station near the *Coroadinho*.

The areas where the intensified processes of erosion were identified because human activities would have more favorable conditions for recuperation from adoption of ways that inhibit environmental aggression like: application of environmental laws that protect these areas, possibly would improve the situation of State Park and the interest of public power in preserve the local enable it with instruments that can hold the progress of the erosive features.

The natural environment needs from the population and from the public power conscience that is necessary to defend and preserve the park natural resources, so that the current and future generations get to know and take advantage of a better quality of life.

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