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DIAGNOSIS OF AN ENVIROMENTAL SYSTEM: THE CASE OF HYDROGRAPHICAL MICRO BASIN OF RIBEIRÃO DAS MARRECAS IN LONDRINA – PR – BRAZIL

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ABSTRACT

The human survival is closely connected to the use we do of our natural resources existing in our planet, in a way that this connection depends on the consumption habits and apprehension of these goods. During the last century (XX), we noticed a boom of technology and a great changing in the habits of the world population. With the information globalization and knowledge, the environmental situation in the planet was more evident, and we concluded that the mankind should rethink the model of exploration of the natural resources. (Stockholm, Rio-92, Agenda 21 among others), and even the social paradigms. The proposal of this work is make a factual approach in this ocean of knowledge and discussions about the environmental problems currently presented in our society. It was chosen as a study unity the Hydrographic basin, specifically the physical processes presented at Ribeirão das Marrecas micro basin river. Collecting the data, basically a physical environmental inventory, characterizing the environment as most detailed as possible of the micro basin by consulting the cartographic documents available and bibliographic information. To the developing of the micro basin hydrographical of Ribeirão das Marrecas, it was necessary the confection of several themes letters. Each item of the inventory was translated into basic themes maps: geological, geo morphological, downward slopes maps, hydrographic, climatologically, the use of the soil and pedological. The intervention unit "hydrographical basin" presents

advantages and disadvantages. The main advantage is that this territorial unit relates the effects/causes of the environmental more clearly and easier measuring. So, we intend to establish the recovery proposals presenting some mitigating alternatives or solving conflicts in the area of the micro basin. Due the region peculiarities, concerning to the dynamic economical and social factors, it becomes imperative that the civil responsibility takes it over in response to the environmental passive, whether they come from naturals means or from the action of man.

Key-words: Environmental diagnosis, Environmental degradation, Hydrographical basin, management and soil conservation, environmental recovery.

INTRODUCTION

The human survival is closely connected to the use we do of our natural resources existing in the planet, in a way that this connection depends on the consumption habits and apprehension of these goods. During the last century (XX), we noticed a boom of technology and a great changing in the habits of the world population. The problems turned to be world problems since the knowledge of such facts came to be of the world interest.

With the information globalization and knowledge, the environmental situation in the planet was more evident, and we concluded that the mankind should rethink the model of exploration of the natural resources (Stockholm, Rio-92, Agenda 21 among others) and, even, the social paradigms.

The proposal of this work is make a factual approach in this ocean of knowledge and discussions about the environmental problems currently presented in our society. It was chosen as a study unity the Hydrographic basin, specifically the physical processes presented in this area of study and the resulted transformation of the human action.

The concept of Hydrographic basin as a unit of planning and managing has been used for more than thirty years (Tundisi, 2003). The use of this natural unit provides a systemic and integrated vision due the clear delimitation and natural interdependence of the climatologic, hydrological and ecological processes. About these subsystems, some anthropogenic forces are working within the interaction of bio-geophysical, social and economical systems. (Ab'Saber, 1998).

THEORETICAL FOUNDATIONS

Christofoletti (1980), defines as hydrographic basin a "drained area for a specific river or a fluvial system". The factors that make an environmental mutual interaction, originating cross related processes, defines geographic scenarios that present using potential based on the characteristics of its components: geological subtract, shapes, geological subtracts, shapes and morphological processes, hydro-meteorological mechanisms and hydro-geological.

EMATER (1987) proposes a more simplified concept of hydrographic basin as a: "drained area by a stream or streams systems connected and convergent, direct or indirectly into a river bank or a waterline".

Beltrame (1994) states that:

> *"The characteristics of the draining net, by its turn, influenced by the declivity e by the rocky subtract, also reflect the potential degradation of the renewable natural resources. The harder the infiltration of water, the higher superficial out flowing, what consequently will take a greater shaping of the channels. This can explain the relation between the density and draining and its influence in the erosive potential in a Hydrographic Basin."*

Guerra & Guerra (1997) shows a hydrographic basin as: *"a group of drained lands by a main river and its tributaries"*. These same authors emphasizes that:

> *"In the longitudinal hollows, it has been observed the concentration of rain water, that is, the superficial out flowing sheet, ending up in the concentrated sheet – the rivers. The notion of hydrographic basin naturally obliges the existence of headwaters or sources, main streams, watershed, tributaries, sub-tributaries, etc."*

For Guerra & Cunha (1998) the hydrographic basin appears as an element that forms landscapes and relief, consequence of dispositional-erosive mechanisms, results of the interaction of several factors: biotic - fauna and flora; no biotic - climate, rock, soil and topographic position; and of human action, that presently is the most prominent changer of the environmental, causing impacts to the landscape and the balance of the environmental systems.

The author above defines hydrographic basin as: *"an area of the land surface that drains water, sediments and melted materials for a common exit, in a determined spot in a fluvial channel"*.

> *"The hydrographic basin has been adopted internationally as a physical territorial unit basic for the planning and management of the natural resources, chiefly the water resources. If the water of a fountain is the result of the drainage of its basin, its quality therefore, its physical characteristics, chemical, biological and ecological, always depend directly on the actions (use and occupation) accomplished on the soil of this basin, as well as of the control degree if there is (or not) over these fountains"*. (Machado, 1998).

Following this reasoning Ferretti (1998) also states in his work that:

"The hydrographic basin has been used more and more as a unit for the environmental planning, today is recognized as unit for the management of the water resources. It is about a physical unit that can be well delimited and identified and its functioning processes."

There are already in Brazil and in Paraná many works based on the hydrographic basin as a research unit.

Many integrated works whose methodology demanded a team from different subjects working together (multi subject) were developed with the participation of many School Institutions related to the environment, and, with or without the government participation.

Area location

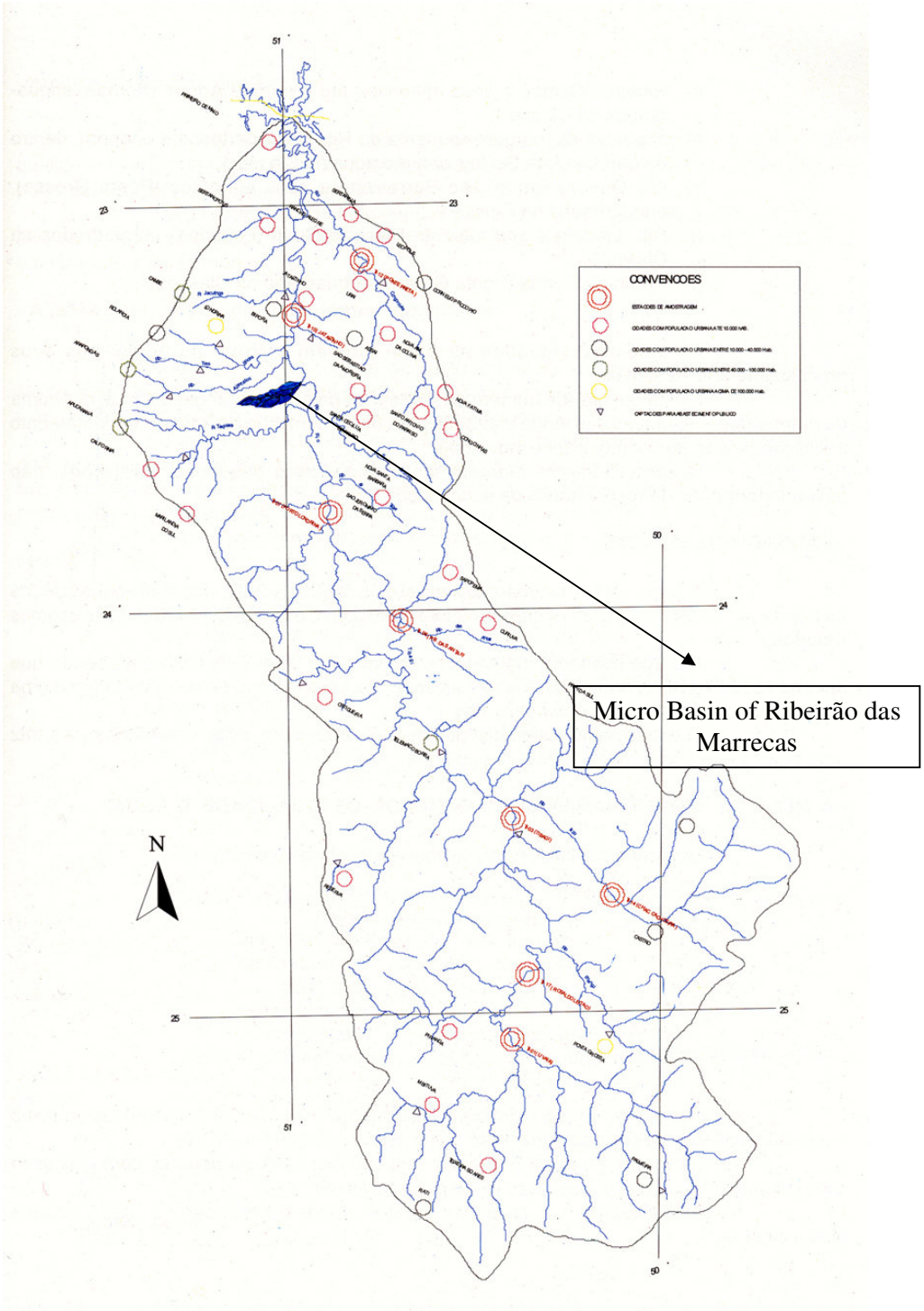

Figure 1 - Basin Hydrographic location of Ribeirão das Marrecas related to the Tibagi River Hydrographic Basin.

PURPOSES

The main general purpose of this work was related to the elaboration of a Environmental Diagnosis of the Hydrographic basin of Ribeirão das Marrecas in Londrina – PR, presenting the involved directives with the environmental management. It was sought also to develop:

- The analysis of the environmental state of the Hydrographic Micro basin of Ribeirão das Marrecas;
- Purpose of the rational use of the area soil.
- Identification of the natural resource potential of the region;
- Elaboration of the base of physical data and biotic of the referred hydrographic basin.

METHODOLOGICAL PROCEDURES

Initially, it started with collecting the data, basically a physical environmental inventory, characterizing the environment as most detailed as possible of the micro basin by consulting the cartographic documents available and bibliographic information. Each item of the inventory was translated into basic themes maps: geological, geo morphological, downward slopes maps, hydrographic, climatologically, the use of the soil and pedological.

To the developing of the diagnosis of the micro basin hydrographical of Ribeirão das Marrecas, it was necessary the confection of several themes letters.

It was used as a basic support aerial pictures 1:50.000 and satellite image LANDSAT TM 5.

The theme maps were digitalized in CAD - Computer Aided Design using Software Microstation.

For the confection of the Clino graphic letter, it was used the applicative SIT WORK, of Software Microstation as the base of digitalization of the level curves, from the topographic letters, in a 1:50.000 scale, generating the digital model (of the land) known as “Digital Elevation Model” – DEM.

Some data were also collected from SIMEPAR and IAPAR concerning to precipitation and temperature. Through the use of SIG – Sistema de Informações Geográficas(Geographical information System) – IDRISI, were inter- connected to some themes that generated another letters necessary to developing of the adopted methodology.

Beltrame (1994) make it clears that the necessity of a suitable and adapted proposal in DFC and other hydrographic basins, so, we have chosen this methodology with the purpose of reevaluate and check its feasibility, since the hydrographic basin studied seemed to have different characteristics.

PARTIAL RESULTS

The basin management may be considered as a result of the adoption of the Hydrographic basin as a unit of planning. The intervention unit "hydrographical basin" presents advantages and disadvantages. The main advantage is that this territorial unit relates the effects/causes of the environmental in a clearer and easier measuring way. So, it was established several recovery environmental proposals in different spots of the micro basin, that once integrated might help in the global preservation of this ecosystem.

The final results of this work may be useful for subsiding the implantation of programs of environmental management of several micro basins of the region.

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