

ENVIRONMENTAL PROBLEMS AT THE AREA OF MUNIM RIVER

DRAINAGE BASIN AT THE TOWN OF CHAPADINHA – MA

Marlo Pereira Lima – UFMA- marlo18@yahoo.com.br

Cássia Elene Borralho dos Santos – UFMA- cassiaelene@bol.com.br

Francicléia Vieira Ribeiro – NEPA/UFMA- clleiavieira@yahoo.com.br

Keyllane Shirley de Carvalho Campos –UFMA- keyllane@yahoo.com.br

Profª Jane Karina Silva Mendonça – UFMA janeksm@yahoo.com.br

INTRODUCTION

Nowadays it is discussed the necessity of preservation of the hydro resources available for consumption. Once the human beings have the consumption of water as something essential for the life, since early they valued water near their houses. This preoccupation continue, although during the last decade, the progressive destructions of nature water reservoirs are observed. Among the depredate actions are: pollution, contaminated rivers and deforestation of ciliary woods near the rivers that become easy and fast the erosive processes.

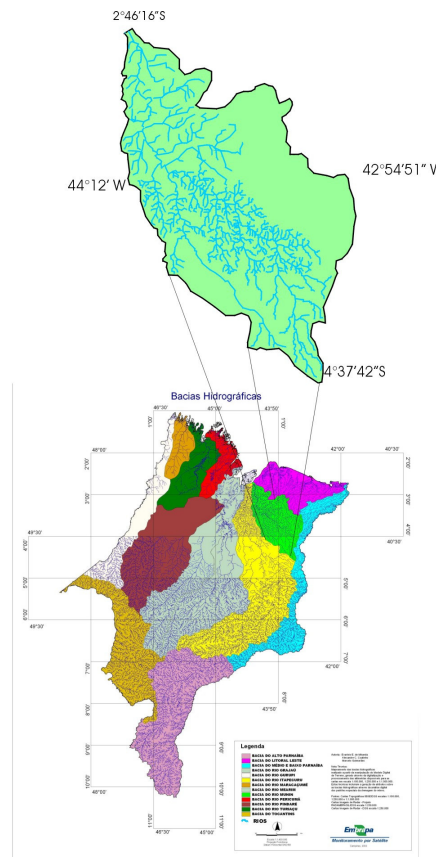
The state of Maranhão, besides is in Northeast, has different physical characteristics from the rest of the region. The drainage basins that are distributed through the Maranhão are composed of principal perennial rivers and tributaries that are sometimes perennial and temporary. In the Munim river basin, the growing urbane evolution results in serious environmental consequences in its way. The stretch studied, in Chapadinha-Maranhão, has suffered quick erosive process and consequently the silting on the riverbanks.

So in this work we intend to identify the principal agents and processes that spoil the fluvial environment provoking the erosion on the banks and the silting of the watercourse.

GEOGRAPHIC POSITION

The area of the drainage basin of the River Munim is located in northeast of Maranhão. During its course from the spring, in Aldeia Altas, to its mouth in the São José basin, it drains water to many towns, among them it is Chapadinha, our study focus. It's limited with the following basins: Periá and Preguiças (N and NE); Parnaíba (S,SE,E) and Itapecuru (NW, SW, W and S). (Pic. 01)

Figura 01 - Mapa de localização do Rio Munim



Fonte: NUGEO/LABGEO, 2002. Adaptado por Ribeiro, 2005.

METHODOLOGY

In this work was adopted the following methods: deductive, because it establishes the probable geomorphologic forms originated by the action of the morphogenetic agents; and the phenomenonologic, since it considers empiric perception of the small rivers in the survey about environment alteration, which it reaches the Munim.

It was performed the following stages:

- Survey and analysis of the bibliographic and cartografic data from the area in studying.
- Research in the area for obtainment of data that refer to the speed of the surface of the river, of the area and the form of transverse section, using the technique developed by Cunha (1996)
- Photographic register from the degraded areas.

- Discussion about the data and the formulation of the final work.

RESULTS AND DISCUSSION

Morphometric Parameter

The main physical characteristics of the visited stretch in the Munin River Watershed are the following: geologically it is in the Parnaíba sedimentary basin, which is formed by Itapecuru and Codó (IBGE, 1984); the geomorphology is characterized by Maranhense Surface with Witnesses; the pedology is marked by the presence of the plinth ground, red podzolic and yellow eutrophic; the sub-humid weather is predominant, with ombrometric rates decreasing from the west (2400 mm) to the east (1600 mm); the *babaçu* trees, the Brazilian scrubland and the scrubland field make the vegetation of the area. (MARANHÃO, 1991).

The Munin river basin receives water from different tributaries, like: *Preto* River and *Iguará*, keeping a minimum outflow that avoid their disappearance during dry weather. It has stretches of preserved ciliary wood that retard the occurrence of erosive processes. (Pic. 02)

Picture 02- Preserved ciliary wood area



The fluvial drainage is constituted of the outflow interrelated with several rivers making a drainage basin. Those basins are classified according to the outflow of their channels in *exorreica*, *endorreica*, *arreica* and *criptorreica*. (CUNHA, 1994: 223).

The Munin River Basin is framed in the type of *exorreica* drainage, because its water flows to the sea, taking with itself intemperate materials from elevated areas from its spring to the coast, modeling the land alongside its way. (Pic.03)

Figura 03- Stretch of rapids



According to the distribution of the Munim river and its tributaries, its drainage is still classified as dendritic or arborescent. Following the Davis classification (1884) *apud* Christofolletti (1980), the Munim River is classified as *insequente*, because it's the river that "flows according to the land morphology to varied direction"(CUNHA, 1994).

The outline of the trasverse section of a river expresses the relation between the width and the distribution of the canal declivities. In the stretch visited the measures of width and medium speed were respectively: 8,25 m and 0,5 m/s (Graphic 01)

According to the data above, it is possible to consider that the stretch analized of th Munim River is narrow, a little deep and few water. The cause of that situation is because of the removal the ciliary wood, intensification of the erosive processes on the riverbanks and posterior silting of the river, in other words, the human actions are the great responsible for the degradation of the fluvial environment. Besides, it is necessary to remember that the period for activities related to the plantation (december), is considered the final dry period in Maranhão. The fluvial regime of the Munim is marked for a dry period with values that refer to the width, deep and leakage very inferior to the rain period. So, since the data collected correspond to only a period, it doesn't represent the river fluvial pattern during the whole year.

Agents and Erosive Process in the Munim Basin Area

According to Mendonça (2003) the erosion of the ground is related with several agents and geomorphologic processes, which are physical, chemical and biological and act in

an individual and collective way, in different temporal and spatial scales. Among the agents we mention: climatic, hydrographic, biotic and degraded anthropic action. It is possible to observe in the area in studying those agents transforming the morphology of the environment in intense way.

Nowadays, it is possible to know through several studies performed in the nature that the erosive processes depend on countless factors that control their acting, they are: the erosive aspect of the rain, ground properties, vegetal cover, characteristics of the slopes and others (GUERRA, 1994). Among the problems caused by erosive processes, the erosion of watercourse bank stands out , the silting of the river and the presence of the erosive feature (ravines and gullies), and others (Pic. 04)

Picture 04 – Gullies on the banks of Munim



The Basin of the Munim River in the stretch of Chapadinha show some problems caused by human action. Among them the more perceptible is the erosion and consequently the silting of the river (Fig.05)

Picture 05 – Erosion on the riverbanks



For Cunha (2003) “the enlargement of the channel are caused because of the erosion and ruined riverbanks; exposed roots; bent and malformed trees and growing into the channel (Pic.06).

Picture 06- Exposed root trees on the bankriver



There are several farms near the riverbank, cultivated after burning the ciliary woods. That practice leaves the ground exposed to action of the extern agents that cause erosion and carry the sediments to the riverbed, since it is the vegetation that protect the ground naturally against the erosive processes. Many erosives processes on the riverbanks are intensified by the deforestation of ciliary woods for the posterior use of the ground in activities related to agriculture, cattle, mining and riparian occupation. According to Mafra (1999) *apud* Guerra

and Mendonça (2004), the erosion of the ground in a watershed produce the degradation of the lands and water.

Social environmental problems

Most of residents of the villages near the bedriver take from it the necessary resources for their survival. Among the uses of the river stand out fishery, removal of gravel and sand, bathing, washing clothes and leisure time. During the interview with some local residents it was mentioned the problem of reduction of fish, due to the technique named *moita*, practiced alongside the river. The *moita* consists of cutting down the ciliary wood to produce an artificial environment for the spawning, after some week fishnet is put around that environment to catch the fish (Pic.06)

Figura 06-Riverrain resident fishing



It is possible to declare that besides of some preservated ciliary wood areas, the environment conditions of the analysed stretch are terrible and it is necessary to take preventive measures to protect it against the aggression resulting from human activities.

FINAL CONSIDERATIONS

It is undeniable that the man is the principal agent of many mechanisms of the transformation of the nature; he can start a whole series of dynamic processes, which can provoke environmental disequilibrium. There are several examples of human activities that many times provoke those alterations. Among several uses ones stand out: the use of ground for agricultural, cattle and mineral activities that damage intensively the environment showing

indifference to the function that the natural phenomena assume in the nature preservation process.

The process of the use and occupation that occur in the stretch visited of the Munim river acts like a transformer agent of natural scenery, generating environmental problems identified in the area. It is necessary the conservation of this basin for the maintenance of the hydrologic equilibrium of the area, considering that if someone doesn't take objective and concrete measures to stop the predatory human action, river will become completely inadequate for the consumption, leaving cities and many families without supply. That reflects a serious problem, for the fluvial environment and for the population who lives around the area.

The removal of the ciliary wood impedes the conservation of fluvial water; because its function is minimize the erosion of riverbanks, avoiding the silting of the watercourse. And besides of ribarian population and others who remove the vegetal protection from the riverbanks, who don't do anything to have a balanced environment, it is necessary to demand mitigating actions from responsible institutions and residents, because it is duty of everybody to preserve the natural resources so that the present and future generation can take advantage of them. If a program that becomes conscious people, who use direct or indirectly the natural resources, about the preservation of environment do not happen, the forecasts about the river preservation are minima.

REFERENCES

CHRISTOFOLETTI, Antonio. **Geomorfologia**. São Paulo: Edgard Blücher, 1980.

CUNHA, Sandra Baptista; GUERRA, Antônio José Teixeira (org). **Geomorfologia: uma atualização de bases e conceitos**. Rio de Janeiro: Bertrand Brasil, 1994.

_____. **Geomorfologia e Meio Ambiente**. Rio de Janeiro: Bertrand Brasil, 1996.

_____. **Geomorfologia: exercícios, técnicas e aplicações**. Rio de Janeiro: Bertrand Brasil, 1996, 345p.

_____. **A Questão Ambiental: diferentes abordagens**. Rio de Janeiro: Bertrand Brasil, 2003.

FEITOSA, Antonio Cordeiro. **Maranhão Primitivo**: uma tentativa de reconstrução. São Luís: Editora Augusta, 1983.

GUERRA, Antonio J. Teixeira; MENDONÇA, Jane Karina Silva. **Erosão dos solos e a questão ambiental**. *In*: Reflexões sobre a Geografia Física no Brasil. Rio de Janeiro: Bertrand Brasil, 2004.

IBGE. **Atlas do Maranhão**. Rio de Janeiro: IBGE, 1984.

MARANHÃO. SEMATUR-MA. **Diagnósticos dos principais problemas ambientais do Estado do Maranhão**. São Luís: LITHOGRAF, 1991.

MEDONÇA, Jane Karina Silva. **A interferência antrópica nos processos erosivos em áreas da bacia do rio das Bicas, São Luís-MA**. Jane Karina Silva Medonça - São Luís, 2003.

NUGEO/LABGEO. **Atlas do Maranhão**. 2. Ed. São Luís: GEPLAN, 2002.