## INSTITUTE FOR APPLIED RESEARCH IN SUSTAINABLE ECONOMIC DEVELOPMENT – IPADES

## **REVITALIZE THE RIVERS BEFORE THEY DIE**

"Of all the direct influences of the forest, its influence on the rivers and on the regularity of its outlets is one of the most significant for the human economy ..."

(ZON 1927 apud Lima 2008).

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The water issue is an environmental challenge as great and urgent as climate change. Brazil holds one of the most extensive, diversified and extensive river networks around the world. The largest country in Latin America has the world largest reserve of fresh water and has the highest water potential of the Earth; about 13% of all freshwater on the planet lies in its territory and 80% of Brazilian waters are in the rivers of the Amazon (Mendonça, 2009). Your responsibility to save him is obvious, because apart from the environmental aspect, is one of the great riches of the 21st century.

The water has a multiple use which includes sanitation, agriculture and irrigation, electricity, waterway transport, industrial, fishing and aquaculture. However, our relationship with this natural resource does not translate its importance. We are a water-intensive society, in global terms, and the planet does not have enough water for all, current patterns of consumption. The population expansion has increased the demand for water, both by personal consumption, and indirectly, by irrigated agriculture and industry. Furthermore, the progressive degradation of rivers.

Off global warming, no other man-made landscape change was more dramatic than the engineering solutions, such as, the impoundment, the settlement and the diversion of rivers in the world. But, it is past the time that these projects provided an effective response to solve water problems. However, although the prospects for the future of the rivers are unfortunate (many of them are already disappearing) there are promising local solutions as revitalization of the riparian forest of these springs.

Brazil has legislation for protecting these springs since 1934, with the Federal Decree n° 24,643 establishing the water code, which provided for legally common waters, municipal and private, free to use. With the Federal Constitution of 1988, all waters were enacted for public use, domain of the Union and the Member States. Law n° 9,433 of 08.01.1997, Water Law, instituted the National Water Resources Policy, created the National System of Water Resources Management and established the River Basin Committees, with the participation of users, the prefectures, of organized civil society and of the other levels of Government (federal and state) to handle their conflicts in every region. And more, set the watershed as the territorial unit for implementation of the national water resources policy, in which occurs the action of the national system of water resources.

As can be seen, the revitalization of rivers does not occur because of a lack of legislation, as well as federal legislation has also the State and the municipalities. How do you say commonly, what you need are the communities "roll up their sleeves" and from to save rivers. It is obvious that not just the volunteerism makes necessary scientific knowledge and planning for such realization of correct and sustainable manner, including a fundamental condition, the environmental education of the population.

Think of revitalization of riparian forests and rivers means to understand the role of the environment in which they are entered: the water catchment area. Various definitions of Hydrographic Basin were formulated over time (Teodoro *et al.*, 2007), which is understandable by complexity of this theme that involves several areas of knowledge such as hydrology, ecology, geology, climatology, among others. Thus, a definition that seems to us particularly interesting focuses on that: *"watershed or drainage of a section of a water course is the geographical area over which the precipitated water that seeps superficially, flock to the section considered"* (Mendonça, 2009).

We can understand, therefore, the Hydrographic Basin as a potential area of capitation system, both available on the surface of water (runoff), as water that infiltrates into the subsoil forming and supplying the springs and the water table. The quantity and quality of this capture system are influenced by physical and biotic factors of the environment, among which we can mention the topographical features of the terrain (such as slope, barriers, among others), geological rock, soil type (affecting the drainage and runoff); the parameters of the vegetation (as type species, coverage, density, leaf area, among others). Vegetation fits the role to maintain the quality and regularity of water control and the integrity of the system as a whole.

Assuming local solution, revitalize the riparian is approaching the natural condition that dominated the ecological environment providing balance to this humid ecosystem. To do so, it is important that all have the notion that the responsibility of each one with the water of the future is directly related to the need we have to consume it. This means protecting the river erosion, silting and establish a micro climate which increase rain in the area influenced by the evapotranspiration of vegetation. Thus, some steps are priorities.

The first is to define what we want or where we want to go, revegetar the area for what purpose? For this, understand the technical nomenclature is important. Terms like recover and restore the vegetation, which although they are used interchangeably in colloquial language (as well as in major dictionaries of the English language), in formal language denote technical difference that is not only terminology, but mainly in the commitment and goals that they lead.

The Law n° 9,985/2000 provides that recovery is the "restitution of an ecosystem or a wild population degraded to a degraded condition, which may be different from its original condition". Restoration is the "restitution of an ecosystem or a wild population degraded as close as possible to its original condition".

**Recovery** involves the restoration of vegetation in the area formerly forested, but here the fundamental concern is before the vegetation itself than in species deployed. For your convenience can be useful in case of emergency actions (such as retrieving slopes), or even when the recovery target any economic purpose or functional (turning degraded areas in monocultures for any particular purpose), but lost in the commitment to restore the relationships eco systemic. **Restoration** unlike involves a work harder, try approaching the primitive vegetation and recover part of the existing functionality, promoting the return of primitive fauna gradually and the diversity of existing interactions.

This distinction is important and extrapolates a single discussion has practical significance nomenclatural causing gaps mainly in the judicial sphere, where the penalty for environmental crimes in impunity outlines wins a judgment dubious. As an example Oliveira & Akaoui (2006) mentioning the determinations of the of Degraded Areas Recovery Plan of the State of São Paulo-DARP (SMA Resolutions n° 04/18/89 and 99), required by the Paulista Executive Power mining extraction activities in São Paulo as an instrument of control of potential risks to the environment presented its Degraded Area Recovery Plan, when in reality the goal would be to restore.

The restoration as already mentioned is a time-consuming and costly, and although there is already a reasonable literature on the topic, we still have little conclusive empirical experience once the effective assessment of the success of this process takes place over dozens of years, the period necessary for the restoration of the flora deployed. In this way, the best method to optimize this process is still using information obtained directly from species in nature, since these evolutionarily over thousands of years have established the best conditions of occurrence in the area of interest.

To do this we must elect templates that target the steps to follow, so we can sample most preserved of riparian areas, knowing the composition (existing species) and its structure (the abundance and location of each kind) and use as a template for your recovery. Observe the structure of vegetation (phytosociology), namely, observe its distribution in vertical and horizontal space looking for patterns. This is a job for Botanical Research directed to the conservation of flora, which is one of the components responsible for the life of the river.

Second definition adopted recently, nature conservation is regarded as all kinds of nature management, including since full protection until the sustainable use and restoration, aiming to the perpetuation of the species and the maintenance of biodiversity (all the diversity of organisms that live in the area, including the genetic diversity, ecological complexity of the physical environment and the variety of biotic interactions and other biological processes) and natural resources in a sustainable way (National System of Units Conservation, Law n° 9,985, July 18, 2000).

Nature Conservation is always faced with two key questions: where conservation is a priority (in this case the riparian forest of the river); and how to make this long-term conservation. The answer to these questions requires clear definitions of conservation targets: species, communities or ecological processes.

Furthermore, due to the complexity of ecological systems, it is necessary to further establish ecological indicators (biological parameters, based on populations, set of populations or systemic properties, which, by its quantitative and/or qualitative characteristics, depict the condition of an ecological system, allowing you to discover and monitor any changes in the system over time), efficient condition of descriptors conservation targets.

The major challenge is to develop indicators that characterize the condition of a given ecological system and are simple enough to be measured and interpreted without difficulty by decision-makers. The selection of indicators is an essential step, due to inability to consider all aspects of biodiversity. The best indicators seem to be those that combine abiotic characteristics with characteristics of the distribution of some species or biological groups. Hence noted what was previously placed: it's working with scientific knowledge, and planning. Like this, Universities, Research Institutes and Planning are essential to the realization of this work.

Another aspect to be considered is how the financial resources for the achievement of the research work and revitalization of riparian vegetation. The actions of prevention, monitoring and combating deforestation, and to promote conservation and sustainable use of forests in the Amazon Biome, pursuant to Decree n° 6,527, August 1, 2008, rely on nonrefundable financing, which is an important stimulus to the revival of the rivers of the region.

Like this, is essential that the beneficiary communities, whether or not rivers basin committees, interested by the recovery of the same, because acting in this way does not run the risk of being without water, and at the same time learn how to manage their use and conservation, what it means to be able to have it where and when it is needed.

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