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**The Role of Environmental Education in Sustainable Management
of Natural Resources: Insights from Sao Paulo City Greenbelt Biosphere Reserve, Brazil**

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Abstract

UNESCO's MAB Programme main aim is the improvement of the relationship between man and the environment within the natural resources management framework. MAB Programme proposes an interdisciplinary research agenda and capacity building that targets the ecological, social and economic dimensions of biodiversity loss. It is based on an international network for knowledge sharing, research and monitoring, education and training, and participatory decision-making. In this regard the current research presents the discussion about the environmental education's role as a dialogue platform for the promotion of Biosphere Reserves management towards a sustainable development. MAB programme considers population altogether with the safeguard of natural resources. The case study involves Sao Paulo City Green Belt Biosphere Reserve (RBCV), located within Mata Atlantica Biosphere Reserve. The RBCV was approved in 1994 and it covers 1.611.710 ha along 73 Municipalities. Peculiarly it is traced within a national important urban centre network, as a strategy to safeguard fragments of biodiversity left by devastating developmental processes. The results about the role of the Education in a participatory management of natural resources, in the frame of MAB, are based on a dialog process which happened in a meeting among different professionals from all around the world working in the context of Environmental Education. The case study considered the Bragança Paulista municipality within the RBCV, incorporating the empirical data to the discussion on environmental education as a tool to Biosphere Reserves management. The main results of these analysis were: (1) policy recommendations to a more effective Natural Resources must be based in a participatory learning process that must include all actors within the Biosphere Reserves, all levels of research an effective communication as precondition and; (2) the main problem target in the current case study is the recognition of local park as a core zone in the RBCV.

Keywords: Biosphere Reserves, Environmental Education, Natural Resources Management

Introduction

The Mata Atlântica Bioma and its rain forest zones, was originally the second largest Bioma of Brazil, covering 15% of the national surface with its estimated 1,29 Million Km². As it is spread from North to South Marine Coast area and also widened inner continentally, it was strategically located in the path of colonization, urbanization and industrialization process in Brazil. Presently the reminiscence of this Bioma represents 95.000 Km², or 7,3 % of the original surface area. It continues to suffer the pressure of the largest metropolitan areas existing in Brazil, such as Sao Paulo and Rio de Janeiro.

The Mata Atlântica Biosphere Reserve was the first one to be established in 1992. It covers the reminiscence of the Atlantic Forest in 14 States. Within it, was created in 1994, the Sao Paulo City Green Belt Biosphere Reserve (RBCV) with an independent management. It covers not only the surrounding area from Sao Paulo City, but also the Sao Paulo State North coast shore, characterized as Marine Protected Area. In a region of megacity's constant urban growing, the urban sprawl within São Paulo's metropolitan region altogether with land-related conflicts (Millennium Ecosystem Assessment, 2005) threaten the protection of these forest reminiscent. In this very special case, the natural protected area is located within the urban categories of UNESCO's Biosphere Reserves (BRs). Considering the urban environment in which this Reserve is included, the role of environmental education presents great importance as management strategy for Natural Resources.

Material and Methods

The role of education on the management of Natural Resources in the context of Biosphere Reserves (BRs) was debated during the Summer School offered by the Ernst-Moritz University Greifswald in March 2009, and followed by the UNESCO World Conference on Education for Sustainable Development (Bonn, April 2009), the role of education on the management of Natural Resources in the context of Biosphere Reserves (BRs) was debated. As it is predicated, the discussions were conducted in a participatory approach process, shared by professionals from a great range of countries, especially those from developing ones. From this exercise, it was pointed the need to reflect about punctual questions on the role of the BRs, and its educational component in conservation efforts. The main results were structured in the form of Poster and presented at Daad Alummni meeting, which happened in parallel to the Bonn Conference.

With consent from the GoBi (Governance of Biodiversity) Research Project, from the Ernst-Moritz University Greifswald, the "Survey on the assessment of success factors for Biosphere Reserve management" questionnaire was translated into Portuguese and applied to RBCV's key-informants, followed by in-depth interviews and documental analysis. The questionnaire encompasses the Evaluation Sheet (FES), with its 27 success factors for a participatory management. Each factor is ranked on a scale from 1 (no relevance at all) to 10 (very high relevance) according to their function for the successful implementation of the biosphere reserve concept. The questionnaire was applied to key agents responsible for the management of the RBCV as a whole and in Bragança Paulista City, as an integrated part of the RBCV.

The results of the questionnaire were compared to Seville 5+ Strategy defined by Unesco for BRs. Within this concept, there are four main objectives to achieve the strategy:

- Conserve natural and cultural diversity
- BRs must be models of land management and of approaches to sustainable development
- BRs must be place of research, monitoring and training
- Continuous implementation of BRs concept.

Results and Discussion

The main results of the Summer School pointed that an effective Natural Resources Management is better achieved through a participatory learning-process that includes stakeholders' dialogues, environmental education, all levels of research and effective communication. Development cooperation initiatives are seen as facilitator to this process. In this context Biosphere Reserves play an important role as integration and learning sites. This result points four actions as essential for the effectiveness of Education and Natural Resources Management within the concept of BRs (Table1). The combination of these four factors and the goals of Seville 5+'s strategy provides a frame for the analysis of primary and secondary data. The final result is high lightening as follows:

Biosphere Reserves Concept	Communication and Education for Sustainable Development	Development Co-operation	Stakeholders Dialog	Research
Goal II: models of land management		Effort to integrate BR's zoning methodology into Municipal Plans	Established the dialog with main actor-Municipality Secretary	Methodology for zoning established
Goal III: Research, monitoring, education, and training.	<ul style="list-style-type: none"> - Sea Paths Ecotourism Pole - Eco Space Foundation - Santa Monica Convention Centre - Prize for the Development Marketplace, World Bank 	<ul style="list-style-type: none"> - SBC and Sto. Andre-Paranap., Sewage and Energy Foundation - BASF/AS, GTZ, SBC municipality, Holistic Association of Ecological and Community Participation - Guarulhos Env. Secretary, Env. Dean 	<ul style="list-style-type: none"> Teenager regional students; Local community, NGOs; Agreement to hire students from the local NEE. 	<ul style="list-style-type: none"> Monitoring by teenagers - Eco Space Foundation Management Plan
Goal IV: Concept's implementation In general good results in Regional level	Need to implement BR concept for other municipalities within RBCV and also at state level.	Need for more cooperation in other municipalities	Stakeholders dialog needed in the RB level and locally	Need a better integration with universities

Table1: Education actions for improving the Natural Resources management according to the Seville 5+ Strategy for BRs

During the recent decades the urbanization process of the metropolitan's periphery of Sao Paulo has showed an expansion pattern of growth six times higher than the central area. This periphery is mostly constituted of illegal settlements that find their way into biodiversity-rich and delicate environments (such as swampland, rivers, slope areas). Indicators show that these areas are characterized for their low rate of infra-structure services and higher illiteracy rate (20% compared to 3% in the central areas), unemployment (18%) and incidence of homicides (up to 150 per 100,000 inhabitants) compared to the central area (5% and 14, respectively). (Victor et al, 2004).

In this context the role of education is seen as essential, but moreover, it provides expectation of social inclusion and generation of work positions. Education must include consumers' education as a major effort in hindering the illegal marketing of wild life and other forest products (Lino, 2002). It must be pointed that the RBCV was created after mobilization power of environmental education happened in 1993 -1995, in face of the construction of the Metropolitan Perimetral

Road Project – Rodoanel. Signatures of 4,000 local residents were raised and both civil society organizations as well as popular manifests were mobilized against the project due to its environmental impacts. The RBCV was created through this genuine popular movement in 1994, supported by Sao Paulo's Forest Institute, which undertook the technical studies for its recognition under the Unesco BRs concept.

The main actions of the RBCV Coordinating Board are the Youth Program with its 15 Units installed, including: (1) Green Belt Research Program and (2) Sustainable Tourism. Through technical qualification of youths in agriforest practices and other "ecomarket" categories it is aimed to generate income and new employment possibilities. Although these programmes show good results they suffer with the oscillation of funds. Other economical activities such as the organic farms tend to contribute for the managing of Natural Resources through environmental education. Within the RBCV, horticultural farmers have formed organizations in order to certify the quality of organic food to their production and specially attend Sao Paulo City restaurants.

Conclusions and Outlook

As what concerns the RBCV management, since its concept, it has been a participative process as ideally envisaged for a BR. It has been fulfilling its role in the sense that it promotes environmental education towards natural resources protection, or even better appreciation of this issue. In addition the RBCV has established integrated territorial management models. The spread of these initiatives to other municipalities is a process foreseen by RBCV's management. The present analysis is still in its initial phase but the role of the Biosphere Reserve in sensitizing on environmental matters, can already be observed. The importance of the RBCVs is confirmed by the cooperation projects from Municipalities and RBCV's management board such as that of Braganca Paulista city, which is fully located in an Environmental Protected Area. In this case the local responsible for the RBCV management has launched a project to recognize a local Park as Core Zone, as well as initiated the dialog process among other municipalities to bring the Youth Programmes to the region.

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