

School of Nature Conservation: An Experience in Education for the Sustainable Development of the Northern Coast of the State of Paraná, Brazil



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Abstract Originally, the Atlantic Forest Biome occupied an area of 130,973,638 hectares, equivalent to about 15% of the Brazilian territory. Due to the exploratory development in the country, there are only 7% remaining of this vegetation, which still suffers from degradation. In this context, inserted in one of the last continuous remnants of Mata Atlântica, are the municipalities of the north coast of Paraná, inhabited by thousands of people. The existence of protected areas in the region (Conservation Units) and the desire for territorial development are sometimes seen as antagonistic and generate conflicts of interest and paralysis of actions. This article brings some results from the School of Nature Conservation, an experience developed with young residents of the region in order to build a network of actors to promote the dialogue between nature conservation and sustainable development. The document describes the context of local conflicts and the immersion-based educational methodology in Conservation Units used by the project to mobilize the community, researchers and managers of conservation units for dialogue and the collective construction of a map of wealth that promotes the sustainable development for the region, taking into account cultural and environmental demands.

Keywords Environmental education · Conservation units · Sustainable development

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1 Introduction

The Atlantic Forest is one of the richest forests in diversity of species on the planet, and this biome covers an area of about 15% of the total national territory, where about 70% of the Brazilian population lives. Today, only 12.4% of the forest that originally existed still exists, and of these remnants 80% are in private areas (SOS MATA ATLÂNTICA 2019).

The ecosystems that make up the Atlantic Forest biome play a very important role in maintaining and balancing for all forms of life that inhabit them, including humans, who benefit directly from water supply, fertile soil, food pollination, medicines, whether comfort, protection against extreme events, the provision of resources and the generation of urban resilience, which fosters development. However, for these benefits to be provided, natural areas in good repair are necessary.

In a report on this subject, the *Gazeta do Povo* newspaper stresses that “Every May, when the Atlantic Forest Day is celebrated, Paraná appears in the not-so-honorable ranking of states that devastate what is left of this type of native forest. Every year, positions take turns - Bahia and Minas Gerais alternate the front—but Parana always shows its presence, as in the most recent Atlas of Remnants, where it is in the third position. Currently, Paraná is the one that mostly overthrew Atlantic Forest in Brazil” (*Gazeta do Povo* 2019).

The United Nations declaration on Agenda 2030 for Sustainable Development states in its paragraph 33 that the new agenda recognizes that economic and social development depends on the sustainable management of our planet’s natural resources, deciding to conserve and sustainably use the oceans and seas, freshwater resources, as well as forests, mountains and arid lands and protect biodiversity, ecosystems and wildlife (United Nations in Brazil 2015).

These data illustrate the importance of the biome for the maintenance of life and, at the same time, how nature conservation has been neglected in recent decades by some sectors of society. Traditional development based on deforestation of native forests, conventional agriculture that poisons soil and food, settling large enterprises that disrespect nature and culture, pollution and burial of water springs, still generates many expectations of growth at any costs, or immediate solution to the Brazilian social illness.

In an attempt to ensure a minimum genetic bank and the benefits generated by nature to maintain quality of life, the creation of Conservation Units through governmental or private initiatives has been an attempt to curb deforestation and its consequences by legislating on some of the remaining of Mata Atlântica that remained in the state of Paraná. However, the implantation of protected areas is cited by plots of politicians, community leaders and residents of the most preserved regions of the biome as impediments to traditional development, due to restrictions of land use and occupation. On the other hand, historical lack of effective community participation in the planning and implementation of different categories of Conservation Units in Brazil fuels rumors, concerns and animosities in the territory, generating

conflicts that are perpetuated even in the present, when community participation is more effective, but still carries impressions of the past.

A protected area, when it is created, cannot be thought of as an island isolated from the rest of society or from the rest of the territory, since the creation of a CU has effects not only for the environmental and natural dimension, but also for the economic dimension, social, demographic and cultural aspects of a given region (Marinelli et al. 2011).

Studies carried out by the Society for Wildlife Research and Environmental Education (SPVS) in the Guaraqueçaba Environmental Protection Area (APA), visiting one thousand households, pointed out important factors that motivated the elaboration of the initiative described in this article. Among the results pointed out by the reports of this NGO with more than thirty years of uninterrupted action, the last twenty in the APA of Guaraqueçaba, stand out the lack of knowledge about nature conservation, more specifically about the operation and purposes of Conservation Units and of research involving biodiversity. At the same time, the data showed great concern among families regarding the generation of regional opportunities and training for young resident people.

The School of Nature Conservation initiative is based on the public use of Conservation Units (CU) on the northern coast of the state of Paraná, based on theoretical and practical training in the form of immersions in the Atlantic Forest for young residents of the region, aiming to promote knowledge and the dialogue between communities, researchers, managers of conservation units and the Public Power for the conservation of nature and caíçara culture, mitigating conflicts and seeking collective solutions for sustainable development.

2 Methodology

The methodology of this initiative was developed by the Society for Wildlife Research and Environmental Education (SPVS) with the support of the Boticário Group for the Protection of Nature Foundation (FGB). The development of the methodology sought to meet the goals to transform our world encouraged by the United Nations in Brazil, especially those focused on Quality Education, Drinking Water and Sanitation, Decent Work and Economic Growth, Sustainable Cities and Communities, Responsible Consumption and Production, Action against Global Climate Change, Life in Water and Earth Life.

Using satellite images and the ArcGiz software, the limits of the Natural Reserves of the Natural Heritage (RPPN) of Águas and Guaricica, as well as the Biological Reserve (ReBio) Bom Jesus, Conservation Units located in the rural area of the municipality of Antonina, Paraná. Using the ArcGiz geoprocessing tool, it was possible to identify the communities located directly in the vicinity of these reserves, and to undergo a personal visit to each one of them to identify families with young people from the age of fourteen who were invited to attend on a specific date with

transportation support to get to know more deeply the initiative previously explained during the visit, and then register to participate in the training.

Of the fifty-two young guests, forty-seven came on the appointed day and made their entries to participate in the formations, which were offered intensively over the next five Saturdays. At the time of enrollment, the initial indicators were collected from the application of personal questionnaires, previously tested in a pilot group. The questionnaires were elaborated in order to investigate the environmental perception about ecosystem services and previous knowledge about conservation of nature and conservation units, so that it could be compared later with indicators collected in the same way at the end of each module of the formations.

The modules took place within the Conservation Units of the region, prioritizing immersion in protected areas and living with the people who work as researchers, inspectors and managers. This action was thus determined to meet the demand pointed out by surrounding communities in relation to promoting the transparency of management actions and management of reserves.

The modules of the formations were chosen to bring elucidation and knowledge about the themes related to nature conservation and sustainable development, as well as for young people to know the possibilities of study and related work. The methodology of the classes was theoretical-practical, previously planned and executed by specialists in the areas. Physical structures and research equipment already installed in reserves such as auditoriums, trails, carbon measurement plots, ecological restoration areas, native seedlings nurseries, trap cameras, bird monitoring equipment, GPS, projector and computers were used in the development of modules that addressed:

- Conservation of Nature: concepts, importance, confronted problems, society-nature relationship, climate change, Brazilian environmental legislation, National System of Conservation Units (SNUC).
- Atlantic Forest Fauna: main species, identification, relationships with the forest, threats, traditional knowledge, monitoring methods and research carried out in the region.
- Flora of the Atlantic Forest: main species, traditional knowledge, identification, relationships with the fauna, indices of deforestation and ecological restoration projects carried out in the region.
- Sustainable Development: concepts, reflections on traditional development and local opportunities for sustainable development, production of nature, regional entrepreneurship, Agenda 2030, life plan and mapping of natural and cultural wealth.
- Boarded Lesson: Navigation through the bay with landscape analysis and application of the knowledge acquired for the development of the “17 objectives to transform our world”, visit to the conservation project of the purple-headed parrot for nests monitoring and conversation with researchers and community involved with the project on Rasa Island, Guaraqueçaba, Paraná.

During the training sessions, students were able to exchange experiences with each other and with experienced researchers in the region on the landscape, Brazilian environmental legislation, biodiversity and local culture, as well as on regional

entrepreneurship and opportunities for sustainable development, taking into account the potential of the Atlantic Forest and Protected Areas in all spheres. They were also able to meet and follow the work of the managers of the Conservation Units of the Northern Coast of Paraná and other collaborators who work in the area, besides living with researchers and their research. The lectures, workshops and experiences in natural areas took place in Conservation Units, where space provides the necessary environment for immersion in Nature Conservation, such as trails and other equipment, providing contact with preserved areas, experiences of restoration of degraded environments, installed researches and people working in the environmental area.

After each of the modules, the students had one week to run local research on the topic and to develop a practical activity, the results of which were shared at the beginning of the next lesson, when impact indicators were collected. Six months after the completion of the modules, the students were interviewed and the impact of the initiative in relation to the perception about nature conservation, the look on the territory and the possibilities of sustainable development were again evaluated.

3 Results

The forty-seven young residents of the rural area of Antonina, Paraná, who enrolled participated in the theoretical-practical training until the end, making a total of forty-four hours of course. These students have shown that they do not want to leave the area when they finish their studies because they are very attached to their family and friends. They also showed that they are not interested in extractive activities and do not practice hunting, although they report that the practice was carried out in the past by some member of the family in 20% of cases.

It was observed that, before the formations, the public was unaware of the definition and purpose of the Conservation Units of the region, especially in the case of the RPPN category, which, because it is managed in a particular way, generates even more doubts in the direct environment. The general idea about a “fenced area to let the bush grow, where human presence is forbidden” prevailed among the participants in the initiative. The expression “nature conservation” was associated mainly with prohibitions, with direct benefits only for the protected of fauna and flora, without positive impacts to society.

Initial indicators also led to non-recognition of regional scenic beauties, since projected local images were attributed to other states or countries, as well as the lack of knowledge of ecosystemic services generated by protected natural areas, such as water consumed by the communities and its relation with the conserved forest.

After the training, the indicators brought an 80% increase in knowledge about nature conservation and the consequent inclusion of the theme in the community's choices, especially in a way related to sustainable development. This fact also appeared in the voluntary organization of groups engaged in the organization of the public use of hitherto unmanaged tourist spots for nature conservation and local development. Indicators presented a 40% increase in knowledge related to native

fauna and a 100% increase in knowledge related to how their monitoring is carried out. As for the native flora, there was a 60% increase in knowledge related to the Ombrophylous Dense Forest ecosystem and 80% related to ecological restoration, carbon stocks and climate change. These issues raised a lot of interest in the students about the benefits generated by the forests for the communities and the local work opportunities related to the production of native seedlings for restoration and meliponicultura, which generated two other workshops later offered in partnership with universities and community.

Increased knowledge about the characteristics of biodiversity, climate and local landscape was one of the focus of formations, promoting affection and belonging, to strengthen the desire for sustainable territorial development, when this knowledge is taken into consideration by the communities in their choices.

Triggered over life planning and regional entrepreneurship, 90% of young people stated that they had their sight modified about the landscape and that they can now visualize local opportunities and development from the nature conservation, involving tourism, outdoor sports, willingness to contemplate the nature and enjoyment of these spaces, the desire to undertake in a sustainable way in the region in adult life, the desire to continue studies in different areas such as photography, design, engineering, education and biology for the conservation of the natural spaces of the coastal region. Five local young residents gave immediate continuity to their studies within the environmental area, while ten of them had opportunities for internships related to the environment in the region for having taken the course.

Promoting immersion in conservation units and dialogue among all local actors has improved relationships, promoted the formation of a network for sustainable development and reduced conflicts between nature conservation and development.

4 Conclusions

Depletion of natural resources and the negative impacts of environmental degradation, including desertification, droughts, land degradation, fresh water shortages and biodiversity loss add to and exacerbate the list of challenges facing humanity. Climate change is one of the greatest challenges of our time and its negative effects undermine the ability of all countries to achieve sustainable development (United Nations in Brazil 2015).

The creation and management of protected areas are essential tools to safeguard biodiversity and quality of life, with the participation of communities at all stages of the process so that there is no conflict and the sustainable development of the region is contemplated, benefiting mainly the environment of the Conservation Units.

The study carried out by Gurgel (2009) demonstrates that the great majority of land use and the exploitation of natural resources allowed in Brazilian Conservation Units predicts and potentiates activities that contribute to the generation of income, employment, increase of quality of life and development of the country, without prej-

udice to environmental conservation, stating that the conflict exists only in relation to the pseudodevelopment based on exhaustion of natural resources.

For example, in the case of Esteros de Iberá—Argentina (Jimenez 2018), analyzing situations of conflict between territorial development and similar nature conservation in other parts of the world, it is observed that the use of education actions aimed at the conservation of nature and cultural value of a given territory bring opportunities to local communities, considering that the existence of protected natural areas, occurrence of rare species, restoration actions and ecotourism can be propellers of sustainable development, thus allying conservation with economic growth and improvement in quality of life.

The Nature Conservation School as conceived is an initiative that proves that education and opportunities for dialogue and exchange of knowledge are essential to create spaces for the collective planning of sustainable development for the benefit of all.

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