



Environmental education with field classes aimed at raising children's awareness about forest and spring preservation in the municipality of Itapira-SP

Environmental education with field classroom aiming to raise children's awareness about forest and spring preservation in the municipality of Itapira-SP

Anderson Martelli;

Ariadne Fabiana Rodrigues Alvarenga^{two};

1. Master in Biomedical Sciences from FHO - Fundação Hermínio Ometto; Biologist at the Department of Agriculture and Environment, Itapira-SP.

2. Graduated in Biological Sciences Puc-Campinas; Specialization in progress Environmental Engineering – UNINTER; Biologist at the Department of Agriculture and Environment, Itapira-SP.

Submitted on: 09/13/2022

Approved on: 09/13/2022

Published on: 09/14/2022 DOI:

10.51473/rcmos.v2i2.353

Summary

Affection, understanding and responsibility are indispensable values in a process and necessary virtues to combat our paradigms regarding environmental preservation, today a concern for all of society. Thus, this article aimed to describe an Environmental Education (EA) action with practical field activities together with children and adolescents enrolled in the Coexistence and Strengthening of Bonds Service in the municipality of Itapira-SP. The practical activities were carried out at the Municipal Nursery located at the headquarters of the Department of the Environment and a monitored visit to the model municipal spring located in the Braz Cavenaghi neighborhood of the municipality. The results demonstrated an excellent interaction between the participants and the activities developed in this study characterize plausible actions with regard to raising awareness among young people and educators regarding the actions preservation of riparian forests, protection of springs, urban afforestation and sequestration of greenhouse gases, serving as a link of participation in the concept of sustainability.

Key words:Source; Seedling nursery; Environmental education, Itapira-SP.

Abstract

Affection, understanding, and responsibility are essential values in a process and virtues necessary to combat our paradigms regarding environmental preservation, today a concern of the whole society. Thus, this article aimed to describe an Environmental Education (EE) action with practical field activities together with children and adolescents enrolled in the Service of Coexistence and Strengthening of Links in the municipality of Itapira-SP. The practical activities were carried out at the Municipal Nursery located at the headquarters of the Secretary of the Environment and monitored visits at the model municipal spring located in the Braz Cavenaghi neighborhood of the municipality. The results showed an excellent interaction between the participants and the activities developed in this study characterizing plausible actions about raising awareness among young people and educators regarding actions to preserve riparian forests, protect springs, urban afforestation and capture the gases that cause the effect. greenhouse, serving as a link to participate in the concept of sustainability.

Keywords:Rising; seedling nursery; Environmental education, Itapira-SP.

1. INTRODUCTION

1

Anthropogenic actions are responsible for many of the changes that contemporary society has been experiencing (ESPÍNDOLA and RIBEIRO, 2020). As man increases his capacity to intervene in the environment by extracting and modifying natural resources for his needs, numerous conflicts occur regarding their use and modification (MARTELLI *et al.*, 2022). In recent centuries, a model of civilization has imposed itself, bringing industrialization, with its form of production and organization of work, in addition to the mechanization of agriculture, canalization of water bodies, intense use of pesticides, occupation of protected areas and urbanization growing, with a process of population concentration in cities (MARTELLI, 2015).



Oliveira Jr. and Sousa (2012) portray that water and atmospheric pollution, deforestation, inappropriate use land, the degradation of water resources, among others, characterize aggravating environmental problems in the contemporary world and stimulate society's awareness so that immediate measures can be taken, giving priority to the conservation of resources essential to the preservation of the planet and people's quality of life, mainly those residing in urban centers.

Among the countless natural resources that have been degraded, we can portray water, which according to Lima (2008) and Caldas and Samudio (2016), is related to the evolution of man, being part of the constitution of our organism and also historically linked with civilizations. that over time they developed following watercourses that could guarantee the supply of cities and food sources, transport, energy generation and reception of the sewage generated; which brought development in terms of engineering and architecture, helping to solve problems related to the use of water as distribution and treatment before and after its use, in the latter case, with an irregular disposal of sewage and, in parallel, urban waste, resulting in numerous health-related problems and the proliferation of diseases.

In the case of springs, Calheiro (2007) defines them as an outcrop of the water table, which will give rise to a source of accumulation water (dam), or watercourses (streams and rivers). According to the Geological Dictionary - Geomorphological, source is the same as the head of a river, with the addition that it is not a point but an area - considerable area of the earth's surface (GUERRA, 2003). A type of vegetation called riparian forest is found around the springs, forest formations that occur along watercourses, fundamental in maintaining the quantity and quality of water in a reservoir, being responsible for the increase in water infiltration into the soil, reduction of the erosion process, containment of ravines, among other advantages (CARVALHO, 2000; BOTELHO; DAVIDE, 2002).

Given these points, one way to mitigate the environmental degradation of forest fragments, springs and bodies of water is the use of environmental education (EA) actions. EA, according to Dias (2004), is characterized by incorporating social, political, economic, cultural, ecological and ethical dimensions, which means that when dealing with any environmental problem, all dimensions must be considered. Pelicioni (2004) describes that to transform a reality it is necessary to know it deeply, to know the needs, interests, difficulties, dreams and expectations of the social groups that make up society.

It is well known that environmental problems influence states and municipalities to think about public policies or action plans, with a view to re-educating society in order to stimulate continued processes that enable alternatives for the conservation, recovery and improvement of this environment (CUNHA, 2018). At this point, we must portray the formation of the Commission of *Brundtland*, chaired by Norwegian Gro Haalen Brundtland, in the preparatory process for the United Nations Conference, also called "Rio 92", where a report was developed that became known as "Our Common Future". In this report, one of the most widespread definitions of the concept is exposed: "sustainable development is that which meets the needs of the present without compromising the possibilities for future generations to meet their own needs" (BARBOSA, 2008), thus, EA and Field classes would be a way to demonstrate our needs, how we are treating them and ways of preserving them for future generations.

Rorato *et al.* (2014) describe that EE activities in the field with practical actions as a tool to raise children's awareness, found that it is possible to obtain an increase in the knowledge acquired by students in relation to environmental issues, contributing to the formation of conscious, responsible and participatory citizens in search of solutions to solve or minimize environmental problems.

two

Taking into account that field activities allow direct contact with the environment, enabling participants to get involved and interact in real situations, this work aimed to describe an EE action where children and adolescents enrolled in the Coexistence and Strengthening Service Links carried out a monitored visit to the Seedling Nursery linked to the Department of the Environment and later to the Nascente Municipal Modelo located in a public area in the Parque Residencial Braz Cavenaghi neighborhood, municipality of Itapira-SP.

2. MATERIAL AND METHODS

2.1 Characterization of the Municipality of Itapira

The Municipality of Itapira is part of the Administrative Region of Campinas and is located in the Southeast region, central-eastern portion of the State of São Paulo, at 22°26'10" S latitude and 46°49'18" W longitude, approximately 63 km (via the bypass ring) from the city of Campinas and 159 km from the state capital.

It has an area of 518,416 km², with an estimated population of 73,844 inhabitants. The urban perimeter has an area of 58,042 m² with a demographic density of 132.21 inhabitants per km² (IBGE, 2020).

2.2 Locations of practical activities for the field class

For the development of the field class, the audience involved were children and adolescents aged 6 to 15, regularly enrolled in the Coexistence and Strengthening of Bonds Service, whose main objectives are to strengthen family and community relationships, in addition to promoting integration and the exchange of experiences between participants, valuing the meaning of collective life.

For practical activities, the Municipal Nursery of Mudás was made available by the Department of Agriculture and Environment of Itapira (Figure 1A). In this nursery, students had contact with tree seedlings native to the local biome, depicting activities carried out in this location and the importance of tree vegetation for residents in urban environments and the environmental benefits of forests.

Subsequently, the children were taken to a public area where the model municipal spring is located for visitation. This is located in the urban perimeter of the municipality of Itapira-SP in the neighborhood called Conjunto Habitacional Braz Cavenaghi, where there is a forest fragment with the presence of two springs (Figure 1B).



Figure 1. In A, municipal seedling nursery with native species from the Atlantic Forest biome; B, model municipal spring that gives rise to an unnamed tributary stream of Ribeirão da Penha

The waters from these springs confluence inside the forest fragment and give rise to an unnamed stream, a tributary of Ribeirão da Penha, the municipality's main watercourse which cuts through the entire urban perimeter.

3 RESULTS AND DISCUSSION

3

The children and adolescents enrolled in the Coexistence and Strengthening of Bonds Service, a body linked to the Department of Social Promotion, were received at the headquarters of the Department of the Environment where the municipality's seedling nursery is located. The monitored visits took place in the morning with a total of eight children and in the afternoon with 14 children.

At the municipal nursery they were received by two biologists responsible for the monitored visit where all the physical structures of this location were presented, as well as the employees who work and care for the plants.

Afterwards, the students were able to see how native tree seedlings are packaged and how they are acclimatized before being placed in the field. The morphology and anatomy of a tree's structures and their functions were explained to those present, a moment of great curiosity and questions (Figure 2A).

During the presentation of the municipal nursery, other topics were discussed such as urban afforestation, emphasizing the species suitable for planting on public sidewalks and the benefits of this vegetation in the built environment; importance of riparian forests with regard to the protection of water bodies and protection from erosive processes, plant cultivation – from seed to formed seedling, biome where the municipality is located, placing emphasis on native vegetation and the negative aspects of exotic species invasive species, among other information pertinent to the topic.

The field lectures were given in a didactic manner according to the age group of children and adolescents, as the work was carried out with students between 6 and 15 years old and who were in the literacy phase, giving everyone the opportunity to express themselves in accordance with what was observed at the site (Figure 2B). The theme was very well received by students and teachers with active participation from everyone and pertinent questions about the topics covered, with reports of situations observed in the places where they live, making a correlation with the content presented.

Field activities constitute an important teaching strategy, as they allow exploring a wide range of content, motivate students, enable direct contact with the environment and a better understanding of phenomena (VIVEIRO; DINIZ, 2009).



Figure 2. Monitored visit to the municipal nursery. In A, explanation of the physical structure of the nursery and the morphology and anatomy of tree structures; B, opportunity to observe the plants and express what was observed

According to Santos (2007), the school, among the countless functions to be performed, is also responsible for society and one of the tools used is EA as a comprehensive form of education, through a participatory pedagogical process that seeks to infiltrate critical awareness in the student. about environmental problems in their locality and municipality.

Afterwards, the students were taken to the model municipal spring (Figure 3A). The shape-
lization of this spring occurred through the Itapira Environmental Defense and Environmental Preservation Council - COMDEMA, which published Resolution 02 of March 1, 2018, taking into account: the need to preserve this spring and the APPs; that this spring gives rise to an unnamed stream, a tributary of Ribeirão da Penha, an important body of water that supplies the municipality; there is a preserved forest fragment in this location with
important native species of the Atlantic Forest biome, providing numerous benefits to the municipality's environment, which in its Article 1, is declared for the purposes of preservation, environmental education and visitation, the spring located in a public area in the Parque Residencial Braz Cavenaghi neighborhood, as a Municipal Spring Model (COMDEMA RESOLUTION, 2018).

4

Upon arriving at the location, students and teachers gathered at the "headwaters" of this spring, with biologists from the Department of the Environment sharing concepts and definitions of springs, including: how water rises, as it is an area strictly urban, the negative factors of this urbanization for this forest and the east,

permeable area and infiltration of water into the soil, groundwater and the use of this water during the dry period to maintain water bodies, the importance of vegetation in the infiltration and supply of this groundwater, formation of streams and rivers, the origin of large rivers and how we can act to preserve these natural resources (Figure 3B).

Due to the area presenting a fragment of stabilized forest (Figure 1B) with species native to the local biome, one of the topics discussed and of great interest to everyone, including educators, was the absorption of CO₂ by tree species through the biochemical process called photosynthesis, being It is emphasized that this gas has contributed significantly to the global warming of the planet, the melting of polar ice caps, the increase in ocean levels, and damage to coastal cities has already been reported. Martelli (2022) carried out a survey of the forest fragment around this spring and how much these plants sequestered atmospheric CO₂, verifying that over 20 years this forest fragment was able to remove and/or neutralize approximately 261.20 tons of this causing gas of the greenhouse effect.



Figure 3. Model municipal spring. In A, water outcrop from this spring; B, Environmental Education action with a lecture in the field on the functions of vegetation in protecting the spring and sequestering GHGs

In this field class, children and teenagers were able to observe the tree canopy, demonstrating that these structures slow down the speed of raindrops, and the plant debris that falls to the ground protects the soil from the direct impact of water and the roots, in addition to serving as a mechanical containment, making the soil more porous and permeable, helping water to infiltrate the earth instead of running over it, and in parallel favoring the maintenance of underground reservoirs, in addition to contributing to the local fauna. These natural mechanisms described here corroborate a study by Martelli and Milano (2021) who describe how the planting of native trees on the banks of a body of water called Ribeirão da Penha, municipality of Itapira-SP influence the absorption of water by the soil during the precipitations.

Regarding the protection of these water outcrops, Biella and Costa (2006) portray that this protection must work with the recovery of riparian forests, which are plant systems essential to environmental balance and, therefore, must represent a central concern for sustainable development. The preservation and recovery of riparian forests, combined with conservation practices and adequate soil management, guarantee the protection of one of the main natural resources, water. The degradation of riparian forests and their replacement by agricultural activities and urban expansion have been causing changes in the quantity and quality of water (DAVIDE *et al.*, 2002; GROSSI, 2006).

According to Duarte *et al.* (2018), the riparian forest is considered by the Federal Forest Code - Law 12,651/2012 as a permanent preservation area, presenting several environmental functions, with everyone being responsible for respecting a specific extension according to the width of the body of water, lake, dam or spring. In art. 7th, this area must - remain untouched, and the preservation and recovery of riparian forests, combined with conservation and management practices adequate soil, guarantee the protection of one of the most precious natural resources, water.

In this class held in the field in both environments described here, it was possible to observe that, given the topics presented, students and the pedagogical team were interested in deepening their knowledge, as well as providing greater clarification on the information on how the municipality deals with numerous environmental issues. sewage,

water distribution network and mitigating measures aimed at wasting this natural resource. Martelli (2012) portrays in his study that EE actions such as holding lectures and explanations on environmental topics in public and private schools and other social institutions are extremely important for the sustainable development of the municipality, increasing students' sensitivity to environmental issues. reality where they live and a path towards preserving and improving environmental aspects.

Oliveira and Amâncio (2018) describe that lectures should emphasize that human beings are part of the environment, being fundamental in the positive and negative changes of this environment and that by degrading the soil and water they will put their own lives and those of their families at risk. . Still within this concept, the population must be informed and guided about the importance of environmental preservation in its countless senses.

Thus, the fieldwork carried out in this action favored the teaching and learning process, being an opportunity for students and teachers to reconcile theory with practice, being an important resource for the teacher in the face of the difficulties that the teacher encounters when teaching on different topics. environmental factors taking into account the lack of teaching resources, lack of necessary information in books and even experiences developed in the municipality and the field class can be a great ally in this sense (SILVA and SANTOS, 2018).

Taking as a reference the fact that the majority of the Brazilian population lives in cities, there is a growing degradation of living conditions, reflecting an environmental crisis, leading to a necessary reflection on the challenges of changing ways of thinking and acting around the environmental issue from a contemporary perspective (JA-COB, 2003). Thus, the actions described in this study would be a way to change this reality, removing people from "passivity" and treating them as active social actors and modifiers of a compromised environment.

Finally, the need to conserve and defend the environment is indisputable. To this end, individuals need to be made aware and, for this awareness to spread among present and future generations, it is important to work on environmental education inside and outside the school, including projects that involve students (SANTOS, 2007).

FINAL CONSIDERATIONS

Currently, it is possible to see that the teaching materials used at different levels of education are like a manual to be followed by the teacher, and their contents are generally linked to a reality in part of the country, not reflecting the local reality of a municipality, but this does not makes it impossible for educators to bring this content to the student's reality, as demonstrated in this action. The textbook is a guiding instrument in pedagogical practices, but it cannot be the only resource, and it is important to innovate the methodology to capture the student's attention and awaken the pleasure of learning.

It was possible to observe that fieldwork is not an activity commonly carried out frequently, and this action can serve as a parameter and stimulus for other practical actions to be developed by other institutions and school units in the city, state and country. The field activities developed in this study favored the formation of conscious citizens, able to decide and act in the socio-environmental reality of their neighborhood and municipality, aiming at the well-being and quality of life of its residents and EA constitutes a promising possibility of action that seeks, through articulated actions, to provide opportunities for people's emancipation, awakening popular protagonism and the construction of sustainable societies.

REFERENCES

6

BARBOSA, GS The challenge of sustainable development. *Visões Magazine*, 4th ed. n. 4, vol. 1, Jan/Jun 2008.

BIELLA, CA COSTA, RA ANALYSIS OF THE ENVIRONMENTAL QUALITY OF URBAN SPRINGS IN CAL-DAS NOVAS – GO. VI National Symposium on Geomorphology/ Regional Conference on Geomorphology, Goiânia, 2006.

BOTELHO, SA; DAVIDE, AC Silvicultural methods for recovering springs and recomposing riparian forests. In: NATIONAL SYMPOSIUM ON RECOVERY OF DEGRADED AREAS, 5., 2002, Belo Horizonte. *Anais...* Belo Horizonte: 2002. p. 123-145.

CALDA, SAB; SAMUDIO, EMM Reused water for industrial purposes: Case study. Brazil Magazine for everyone. v. 3, no. 2, 2016.

CALHEIRO, RO Preservation and recovery of springs (water and life). 4th ed. Piracicaba-SP, 2007. p. 40.

CARVALHO, PER Techniques for recovery and management of degraded areas. In: GALVÃO, APM Reforestation of rural properties for productive and environmental purposes: A guide for municipal and regional actions. Brasília: Embrapa Florestas, 2000. chap. 14. p. 251-268.

CUNHA, FC Environmental education: a description of the actions carried out in the municipality of Cruz das Almas (BA). Revbea, São Paulo, v. 13, no. 3, p. 76-95, 2018.

DAVIDE, AC, PINTO, LVA, MONNERAT, PF, BOTELHO, SA Spring: the true treasure of rural properties – what to do to conserve springs on rural properties. Lavras Magazine: UFLA; 2002.

DIAS, GF Environmental Education - Principles and Practices. 9. ed. Gaia Brasil, 2004.

DUARTE, MBCP; SANTOS, MF P, FALCÃO, NAM; SANTOS, ACM Field work in the recovery of the riparian forest of Riacho Gulandim. Proceedings of the 1st International Colloquium on Geographic Education and the 4th Seminar Teaching Geography in Contemporary Times. v. 1, no. 1, 2018.

ESPÍNDOLA, IB; RIBEIRO, WC Cities and climate change: challenges for Brazilian municipal master plans. Cad. Metrop., São Paulo, v. 22, no. 48, pp. 365-395, May/Aug 2020.

GUERRA, AT New Geological-geomorphological dictionary. 3rd ed. Rio de Janeiro: Bertrand Brasil, 2003.

GROSSI, CH Environmental diagnosis and monitoring of the Queima-Pé river micro-basin, MT [thesis]. Botucatu: Faculty of Agricultural Sciences, Universidade Estadual Paulista, 2006.

BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS – IBGE Cities: 2010 Census Available at: <https://cidades.ibge.gov.br/brasil/sp/itapira/panorama> Accessed on July 9, 2022.

JACOBI, P. Environmental education, citizenship and sustainability. Research Notebooks, no. 118, p. 189-205, March/2003.

LIMA, Walter de Paula. Forest Hydrology applied to river basin management. Piracicaba: University of São Carlos, ESALQ, 2008. p. 29 – 36.

MARTELLI, A. Environmental Education as a method of promoting urban afforestation in the Municipality of Itapira-SP. REGET - Electronic Magazine on Environmental Management, Education and Technology, v. 19, no. 2, May - Aug. P. 1195-1203, 2015.

MARTELLI, A.; CARDOSO, MM; VALADARES, ALP Reconstitution of the riparian forest in Ribeirão da Penha, municipality of Itapira – SP and minimization of greenhouse gases. Environmental Educommunication Magazine. v. 2, no. 2, July/ December, 2012.

MARTELLI, A. Forest fragment in the municipal spring of Itapira-SP favors carbon neutralization mitigating the greenhouse effect. Journal of Interdisciplinary Debates, vol. 3, no. 01, 2022.

MARTELLI, A.; MILANO, CB Planting of trees in celebration of World Water Day and the influence of these vegetables on the absorption of water in the soil during rainfall. Faculty of Knowledge Magazine, v. 6, no. 13, 2021.

OLIVEIRA, HLP; AMÂNCIO, RC Inadequate disposal of solid waste on the banks of the Óleo stream: from the source of the Mansour neighborhood to the mouth of the Uberabinha river in Uberlândia /MG. 9th International Solid Waste Forum, Porto Alegre-RS, 2018.

7

OLIVEIRA JÚNIOR, EF; SOUZA, IS The environmental impacts resulting from human action at the source of the Piauí River - Riachão do Dantas/SE. Electronic Magazine of Faculdade José Augusto Vieira, Year V, n. 7, 2012.

PELICIONI, AF Trajectory of the Environmentalist Movement. In: Environmental management course, p. 19. ed. Manole, 2004.

COMDEMA RESOLUTION No. 02, OF MARCH 1, 2018. Available at: http://www.itapira.sp.gov.br/governo/jornal_oficial/ano7/numero473.pdf. Accessed on May 14, 2022.



RORATO, GG, CANTO-DOROW, TS, RORATO, DG, ROSITO, JM Environmental education and awakening to citizenship. Reget. v. 18, no. 2, p. 745-752, 2014.

SANTOS, ETA Environmental education at school: awareness of the need to protect the ozone layer. Environmental Education at the Federal University of Santa Maria, 2007.

SILVA, AF; SANTOS, WV The use of methodological resources in teaching geomorphology: an analysis of textbooks and a reflection on the importance of field classes. Proceedings of the 1st International Colloquium on Geographic Education and the 4th Seminar Teaching Geography in Contemporary Times. v. 1, no. 1, 2018.

VIVEIRO, AA, DINIZ, RES Field activities in science teaching and environmental education: reflecting on the potential of this strategy in school practice. Science on Screen, v. 2, n.1, 2009.

