

ENVIRONMENTAL EDUCATION IN FERNANDO DE NORONHA: REFLECTIONS AND PERSPECTIVES

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ABSTRACT

With the creation of the Fernando de Noronha National Marine Park in 1988, the local community had to adapt to the new regulations and reconcile the challenge of sustainability in harmoniously combining tourist activity and the preservation of natural resources. This study aims to investigate the evolution and current situation of environmental education in Fernando de Noronha. It is a qualitative and descriptive approach, using bibliographical and documentary research and participatory observation. The results of the research

indicate that environmental education has been a great tool in raising awareness and training, especially about environmental care and sustainable practices that the community learns, assimilates and consequently passes on to tourists and new residents. However, it faces significant challenges, such as pressure from tourism. It needs to strengthen local and international partnerships, include strategies to deal with the impacts of climate change and create a District Environmental Education Policy, among other actions.

KEYWORDS: Environmental education, Fernando de Noronha, Brazil.

A EDUCAÇÃO AMBIENTAL EM FERNANDO DE NORONHA: REFLEXÕES E PERSPECTIVAS

RESUMO

Com a criação do Parque Nacional Marinho de Fernando de Noronha em 1988, a comunidade local precisou adaptar-se às novas regulamentações e conciliar o desafio da sustentabilidade em aliar de forma harmônica a atividade turística e a preservação dos recursos naturais. Este estudo tem o objetivo de investigar a evolução e a situação atual da educação ambiental em Fernando de Noronha. Trata-se de uma abordagem qualitativa e descritiva, utilizando pesquisa bibliográfica, documental e observação participativa. Os resultados da

pesquisa indicam que a educação ambiental tem sido uma grande ferramenta na conscientização e formação, principalmente sobre os cuidados ambientais e práticas sustentáveis que a comunidade aprende, assimila e consequentemente transmite aos turistas e novos residentes. No entanto, enfrenta desafios significativos, como a pressão do turismo. Precisa fortalecer parcerias locais e internacionais, incluir estratégias para lidar com os impactos das mudanças climáticas e criar uma Política Distrital de Educação Ambiental, entre outras ações.

PALAVRAS-CHAVE: Educação ambiental, Fernando de Noronha, Brasil.



1 INTRODUCTION

Fernando de Noronha is an archipelago of great ecological and environmental importance, and an important tourist destination for Brazil. It stands out in the imagination of Brazilians as a natural paradise, and every year it becomes better known on the international stage. Tourism is the main economic activity and plays an important role and deserves to be adapted and organised in a sustainable way to preserve the archipelago's natural landscapes, environment, fauna and flora. Therefore, the challenge of sustainability is to harmoniously reconcile tourism and the preservation of natural resources.

Environmental education is essential for promoting the conservation of natural resources, mitigating climate change and building more sustainable societies. It is an important tool that aims to increase awareness and understanding of environmental issues in order to empower individuals and communities to make informed decisions and act sustainably.

The aim of this study is to investigate the evolution and current situation of environmental education in Fernando de Noronha, from 1988 to the present day.

This study can be of great importance within the scientific context as it is a contribution to the field of environmental education, offering both a current analysis and innovative perspectives that can influence educational practices, public policies and environmental conservation in Fernando de Noronha and beyond.

This article is structured in five main sections. This is section 1 with the introduction. Section 2 provides a brief bibliographical review of environmental education. This is followed in section 3 by a characterisation of the study area and details of the methodology used to conduct the research, including the approaches and techniques used to collect and analyse the data. Section 4 presents the results obtained and the discussions, where the findings are interpreted in the light of the current context and future prospects for environmental education in Fernando de Noronha. Finally, section 5 concludes the article with a summary of the main contributions and implications of the study, as well as suggestions for future research. The references used throughout the article are listed at the end.

2 BIBLIOGRAPHIC REVIEW

This section presents a brief theoretical review of the topic covered by this study: environmental education.

The modern environmental movement began in the 60s. It was an important period for environmental awareness and mobilisation in favour of preserving the environment.

In her book *Silent Spring* (1962), Rachel Carson denounced the harmful effects of toxic substances such as the pesticide DDT, which were released into the environment in the 1940s and 1950s, causing long-term damage and consequences to the environment and human health, and emphasised the need for a more responsible and sustainable relationship with nature. This

information sparked the contemporary environmental movement and influenced the creation of environmental policies around the world.

This movement influenced other countries and resulted in the convening of international conferences, such as the United Nations Conference on the Human Environment in Stockholm in 1972. This conference was an important milestone for environmental education.

The concept of environmental education was formally recognised and consolidated during two other important conferences held by the United Nations (UN) in 1975 in Belgrade and 1977 in Tbilisi, both of which were fundamental to the history and development of environmental education. At the International Seminar on Environmental Education in Belgrade, the Belgrade Charter was created, outlining the objectives, goals and basic principles of environmental education. The Intergovernmental Conference on Environmental Education in Tbilisi established fundamental principles, objectives and guidelines for the implementation of environmental education on a global level.

In Brazil, in 1992, the Rio 92 Conference was held, which became known as ECO-92, and this was the moment when environmental education gained notoriety in the country.

The National Environmental Education Policy was created in 1999 and establishes the guidelines and principles for promoting environmental education. It aims to promote environmental education as an essential tool for sustainable development, encouraging practices and behaviours that contribute to the preservation and improvement of the environment. According to this legislation, environmental education is defined as the processes through which individuals and the community build social values, knowledge, skills, attitudes and competences aimed at conserving the environment, which is a good for the common use of the people, essential to a healthy quality of life and its sustainability (Brasil, 1999).

Environmental education comprises multidisciplinary knowledge and is of great relevance to society.

According to Leff (2002), Environmental Education is a tool that provides knowledge, enabling people to understand the complex phenomena of the environment. This understanding helps to develop ethical, economic, aesthetic, political and cultural values that promote behaviour in line with preserving and improving the environment.

Many people are not fully aware of the importance of environmental education as a tool for dealing with social and cultural issues. Through environmental education, greater responsibility and awareness can be promoted about actions that can have a significant impact on the environment (Campos et al, 2024). For this reason, raising awareness is one of the main objectives of environmental education.

From this perspective, it can be said that forming aware citizens who are prepared to make decisions and act in the socio-environmental reality, with a commitment to life, to the well-being of each individual and of society, both at a global and local level, is the main function of environmental education (Melazo, 2005).

Environmental education therefore needs to promote a change in society's habits. The concepts of the "3 Rs" - reduce, reuse and recycle - emerged to remind people of the actions needed to deal with the problem of excessive consumption and solid waste (Connett, 2013). Today, the concepts of the "9 Rs" are already being addressed, as explained by Kirchherr et al (2017) below:

1. *Refuse*: avoid using products that generate unnecessary waste.
2. *Rethink*: re-evaluate the use of products to minimise waste.
3. *Reduce*: reduce the amount of resources used in production and consumption.
4. *Reuse*: using products more than once in their original form.
5. *Repair*: fixing broken or damaged products to extend their useful life.
6. *Refurbish*: renovate used products so that they work like new again.
7. **Remanufacture** (*Refurbish*): using components from used products to manufacture new products.
8. *Repurpose*: using a product for a purpose other than that for which it was originally designed.
9. *Recycle*: process used materials to turn them into new products.

According to Carvalho (2006), the affirmation of a socio-environmental vision implies recognising the interdependence between social and environmental issues, where environmental degradation cannot be dissociated from social inequalities. Carvalho argues that it is essential to adopt an integrated perspective that considers the environmental impacts on the most vulnerable populations, thus promoting socio-environmental justice. She also highlights the importance of environmental education as a fundamental tool for raising awareness and changing society's behaviour. Environmental education should be seen as a continuous and transformative process, capable of forming critical citizens who are engaged in building a sustainable future, where environmental protection and social development go hand in hand.

Economic growth needs to be geared towards integrating social and environmental dimensions into all decisions in order to achieve sustainability. In this sense, tourism as an economic activity would seek in sustainable tourism a form of tourism that meets the needs of tourists, tourism and local communities today, without compromising the ability of future generations to meet their own needs (Swarbrooke, 2000).

If this is the case, sustainable tourism can be seen as a plausible response to this challenge of (re)structuring tourist activity focussed on environmental conservation and a more supportive and ethical environment (Irving, 2002).

In this way, awareness and knowledge of impacts and mitigating actions are therefore requirements for the environmental sustainability of tourism within the economic market. Tourists and tourism companies are therefore expected to recognise and take responsibility, making it important to have a legal system in place to control these systems (Cooper et al., 2007).

Environmental education practices should be understood as a continuous and participatory process that seeks to develop a population that is aware of and concerned about the environment and the problems associated with it, and that has the knowledge, attitudes, motivation, commitment and skills to work, individually and collectively, to find solutions to existing environmental problems and to prevent new ones (Dias, 2004). Environmental education is about a paradigm shift (Sorrentino, 2005).

3 METHODOLOGY

This section describes the methodological procedures adopted to investigate environmental education in Fernando de Noronha. Firstly, the study area is characterised, followed by a description of the approach used, as well as the data collection and analysis methods.

3.1 Characterisation of the study area

The Fernando de Noronha archipelago is located in the South Atlantic, in Brazilian territorial waters, 360 kilometres from Natal and 545 kilometres from Recife, as shown in Figure 1 with a satellite image of the location.



Figure 1 - Location of Fernando de Noronha

With 21 islands, islets and rocks, only the main island is inhabited. The main island, which is also called Fernando de Noronha, covers 17 square kilometres, is around 10 kilometres long, 3.5 kilometres wide at its widest point and has a perimeter of approximately 60 kilometres. It has sixteen beaches, twelve of which are on the inside sea, which faces Brazil, and four on the outside sea, which faces the African continent. To this day, tourism is the main economic activity.

Of volcanic origin, the Fernando de Noronha archipelago is the top of a submerged mountain, the base of which is at a depth of 4,000 metres. It is part of the Atlantic Forest biome, where you can find the last vestiges of island Atlantic forest, as well as the only oceanic mangrove swamp in the South Atlantic.

Fernando de Noronha is known for its stunning turquoise and emerald green seas, with warm, crystal-clear waters. Its main attractions include the rich marine fauna, with a wide variety of fish, sea turtles that spawn on the island, and spinner dolphins, one of the symbols of the archipelago. The island also has colourful coral reefs, canyons and underwater caves. For all these reasons, Fernando de Noronha is considered one of the best diving spots in the world and a tourist

destination of international importance.

In 1988, the Fernando de Noronha National Marine Park was created with the aim of preserving the local fauna and flora, as well as promoting scientific research. As a result, the locality was more widely publicised in the media, which increased people's interest in getting to know this place of immense natural beauty. That same year it was reintegrated into the then state of Pernambuco. With its reintegration into Pernambuco, it became the State District of Fernando de Noronha, the only one in the country.

The Noronha community is made up of permanent residents who have the right to live there, according to pre-established criteria, such as having been born on the island and/or being the child of a permanent resident, among others, and temporary residents, who are dependent on the permanent resident or company in the district and have limited rights.

As far as education is concerned, there are two public schools: Bem-me-Quer, with nursery education, and Arquipélago, with primary and secondary education. In recent years, the community has come to rely on higher education, made possible through agreements with higher education institutions that offer distance learning, and so far the following courses have been offered: Administration, Biology, Pedagogy and Social Work.

Fernando de Noronha is a World Natural Heritage Site, a title awarded by UNESCO in 2001.

3.2 Approach

This study uses a qualitative approach to explore the characteristics and dynamics of environmental education in the locality. The aim of this research is also descriptive, as it describes the characteristics of a population or phenomenon (Gil, 2008). In this case, the study describes environmental education in Fernando de Noronha.

3.3 Data collection

The technical resources used to obtain data were: bibliographical research, documentary research and field surveys with participant observation. Bibliographical research provides a greater degree of breadth, saves time and enables data to be collected (Dencker, 2000). Documentary research is characterised by the use of materials that have not received prior analytical treatment, such as written documents, photographs, films, among others (Gil, 2008). Participant observation, a qualitative research technique with origins in anthropology, takes place during a long-term stay, where the researcher participates in the reality of the community and assimilates knowledge from the group (Goldenberg, 2009). The time frame of the research covers the period from 1988 to the present day.

The bibliographical research involved consulting books, theses, dissertations and national and international scientific journals relevant to the subject of environmental education. The following databases were used: Catalogue of Theses and Dissertations of the Coordination for the Improvement of Higher Education Personnel (CAPES), Directory of Research Groups of the National Council for Scientific and Technological Development (CNPq), *Scopus* and *Web of Science*.

Documentary research was carried out in Fernando de Noronha's public archives, analysing official documents including:

- Fernando de Noronha National Marine Park Management Plan (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis [IBAMA], Fundação Pró-Natura [FUNATURA]. (1990);
- Management plan for the Fernando de Noronha archipelago: ecotourism and sustainable development - phase 2 and 3 (Instituto de Administração e Tecnologia [ADM&TEC], 2001);
- Opinion poll of the Noronha community in 2004 (Administration of the State District of Fernando De Noronha [ADEFN], 2005);
- Management Plan for the Fernando de Noronha, Rocas, São Pedro and São Paulo Environmental Protection Area (Tetraplan Consultoria e Planejamento, 2005);
- Study of the carrying capacity of the Fernando de Noronha, Rocas, São Pedro and São Paulo Environmental Protection Area (Elabore Assessoria Estratégica em Meio Ambiente, 2007);
- Study and determination of support capacity and its sustainability indicators with a view to implementing the management plan for the Fernando de Noronha Archipelago Environmental Protection Area (Elabore Assessoria Estratégica em Meio Ambiente, 2008);
- Strategic tourism plan for Pernambuco (Creative Industries, 2008);
- Sustainability programme for the Fernando de Noronha archipelago - a participatory construction - Noronha +20 (Instituto Chico Mendes de Conservação da Biodiversidade [ICMBio], 2011);
- Integrated solid waste management plan for Fernando de Noronha (Engeconsult Consultores Técnicos Ltda, 2011);
- Integrated sustainable tourism development plan for the Costa dos Arrecifes (Ambiens Sociedade Cooperativa, 2013);
- Fernando de Noronha tourism development plan (Malungo, 2013);
- Management Plan for the Fernando de Noronha National Marine Park (Tetraplan Consultoria e Planejamento, 2017);
- District Decree No. 002, of 12 December 2018. (Administration of the State District of Fernando De Noronha [ADEFN] (2018).

It should be noted that Fernando de Noronha's masterplan is still being drawn up and has not yet been published.

During participant observation, the researcher became involved in the activities of the local community, taking part in events, educational programmes and environmental initiatives. In addition to the observation that took place during the field research, the researcher has lived in Fernando de Noronha since 1993, when she first visited the area, between 1995 and 2007 when she lived and worked on the island, and since then on several other visits to date.

3.4 Data analysis

The data collected through bibliographical and documentary research and participant observation was analysed systematically. Initially, the data was organised and categorised according to its source. Coding was then carried out to identify emerging themes and patterns, grouping them

into broad categories. Triangulation was used to compare and validate the information obtained from the different sources, ensuring the consistency and reliability of the results.

The data was interpreted by contextualising it in the Fernando de Noronha scenario, comparing the findings with existing literature and exploring their implications. The results are presented descriptively, using specific examples and direct evidence to support the interpretations. We conclude by discussing the practical implications of the findings and suggesting directions for future research.

4 RESULTS AND DISCUSSIONS

This section presents the results and analyses and discusses the various aspects of interest.

With the re-annexation of the Fernando de Noronha archipelago to the state of Pernambuco and the creation of the National Marine Park in 1988, tourism began to expand and became the main economic activity. As a result, the community had to learn to live with the new rules imposed by the creation of the conservation unit, and also to reconcile the great challenge of sustainability in harmoniously combining tourist activity and the preservation of natural resources.

The development of tourism in Fernando de Noronha has been marked by a controlled approach aimed at preserving the archipelago's unique ecosystem. Since opening to visitors in the 1980s, strict environmental preservation policies have been implemented, including limiting the number of tourists and charging preservation fees. Tourist activities are geared towards ecotourism, with a focus on experiences such as diving, ecological trails and marine life observation.

The environmental education activities carried out in Fernando de Noronha are varied and aim to make both the local population and tourists aware of the importance of environmental preservation.

Environmental education in Fernando de Noronha has been formalised through initiatives by governmental and non-governmental institutions, with the implementation of educational programmes, and has also begun to be integrated into local schools and tourist visitation programmes, emphasising the importance of marine and terrestrial conservation.

Environmental education programmes have expanded significantly. Projects such as the Spinner Dolphin Programme and initiatives by the Tamar Project Foundation have had a major impact. These programmes involve visitors and the local community, especially children, in conservation and environmental monitoring activities. These partnerships also facilitate research and the implementation of new educational practices and guarantee the continuity and improvement of educational programmes.

The TAMAR Project, which works on the research and conservation of sea turtles, has an Ecotourism and Environmental Education Programme in Fernando de Noronha, with six activities: scientific capture, release of hatchlings, lecture cycle, island tour, guided visit to the open sea turtle museum and turtling.

One study analysed the period from 2013 to 2016 and found that 160,000 people followed the environmental awareness promoted by the TAMAR Project (Lima et al., 2018).

One of the programme's first activities began at the end of the 1980s with a series of lectures that still take place today in a dedicated space, with informative talks every day of the week on a particular theme, and is a must for tourists.

When she lived on the island, the author used to give a weekly talk entitled "Getting to know Noronha", and at the end of the talk she warned about the importance of caring for nature and asked people not to take anything from the natural environment. Years later, the author met someone in Rio de Janeiro who reported that, after attending the talk with her mother, she had returned the next day to all the places where she had picked up stones to return them, deciding not to take the stones from Noronha to Rio. This story illustrates the transformative power of environmental education, showing how awareness can inspire responsible actions and preserve nature.

In addition, the increase in ecotourism encouraged sustainable practices and environmental awareness among visitors. Training programmes for tourist drivers and teachers have also been stepped up, ensuring that the message of preservation is widely spread.

For example, between the second half of 2002 and the first half of 2003, in Fernando de Noronha, PE, the project "Continuing teacher training in environmental education at the Fernando de Noronha Archipelago School" took place, developed by the Ibiré Society Foundation for Education for Sustainable Development, a Civil Society Organisation of Public Interest (Sena et al., 2013).

Local schools take part in programmes that include thematic lessons on ecology, biodiversity and environmental conservation. Specific programmes are developed to raise children's awareness of the importance of preserving the environment from an early age. These lessons are integrated into the school curriculum and aim to develop a deep understanding of the importance of the environment. Students visit protected areas of the archipelago, such as the National Marine Park, accompanied by guides who provide information about the local fauna and flora. There are always ecological holiday activities during the holidays.

The local community is heavily involved in environmental education initiatives. Regular beach cleaning campaigns involve the community and tourists in removing solid waste from the beaches, raising awareness about the impact of marine litter. There are events such as Environment Week that include a range of educational activities, from exhibitions and talks to workshops and recreational activities for children and adults.

In the period after the creation of the Fernando de Noronha National Marine Park, many traditional practices came into conflict with the new environmental rules, and adults were often sensitised by children and young people who brought home the lessons they had learnt at school.

The environmental care that the community learns, assimilates and consequently passes on to tourists and new residents alike.

"I remember when I arrived to live on the island, I threw a piece of candy wrapper on the ground in the street outside the school, and a young man pointed out to me that on the island nobody threw anything on the ground. I learnt my lesson!" (Resident, as quoted in Lima, 2014).

According to the Fernando de Noronha Integrated Solid Waste Management Plan, environmental education work should be governed by a broad Environmental Education Plan, which in turn will be made up of Sectoral Environmental Education Projects in the areas of Health, Education, Infrastructure, Urban Control and Environmental Management. The latter sector should preferably coordinate its implementation in line with the premises presented here, making use of the administrative structure in place and necessarily working in an integrated manner. This Environmental Education Plan, in addition to the projects that will define the various sectoral actions to be installed with each specific group (school, health unit, Solid Waste Treatment Plant, etc.), will also comprise a Social Communication Project, which will determine with uniformity and appropriate techniques the forms and vehicles of mass communication, standardising the most appropriate language of the instruments and mechanisms to be used (e.g. Videos, Vignettes, Booklets, Manuals and/or Pamphlets) (ENGECONSULT, 2011).

Although there have been some commendable initiatives, such as "Noronha Plástico Zero", aimed at reducing plastic, it is clear that the implementation of the plan has been limited, and much of it has remained on paper, and needs improvement to achieve all its objectives. Efficient solid waste management is one of the most important points for preserving Fernando de Noronha's delicate ecosystem, and a continuous commitment and constant improvements are needed to overcome the current challenges.

According to the results of Lima's dissertation (2014), solid waste management is critical and unsustainable. The lack of a selective collection programme, reverse logistics systems and conscious consumption practices makes the situation even worse. It is imperative to review the treatment and disposal of solid waste in order to plan more effective operations. In addition, environmental education must be implemented on an ongoing and structured basis, rather than only being tackled in one-off situations.

There is a lack of environmental education programmes to encourage the implementation of waste reduction, reuse and recycling activities (Lima, 2014). Ten years later, the situation remains similar, with the only change being the implementation of the Zero Plastic programme. There is still a significant lack of environmental education programmes to encourage waste reduction, reuse and recycling activities and it is important to work on conscious consumption through environmental education programmes.

In addition to the Integrated Solid Waste Management Plan for Fernando de Noronha mentioned above, the documents analysed in this study that propose environmental education actions include the management plans for the Fernando de Noronha National Marine Park and the Environmental Preservation Area, as well as the sustainability programme for the Fernando de Noronha archipelago, called Noronha +20. It is important to note that all the future plans mention environmental education strategies, but also emphasise the importance of implementing these

measures in practice, in order to effectively promote environmental conservation and sustainability in the area.

The growing popularity of Fernando de Noronha as a tourist destination continues to be a challenge. Large-scale tourism can cause negative impacts on the environment. Sustainable tourism management is essential to minimise negative environmental impacts. This includes implementing responsible tourism policies and educating tourists about sustainable behaviour. Ensuring that all tourists and new residents receive adequate environmental education is a challenge, especially in high season.

And the initiatives need to ensure that the whole community has access to environmental education and actively participates in the projects. It can be seen that with the increase in tourism, the number of temporary residents has also increased, and many of them are not having access to environmental awareness, and continue to produce standards that are not suitable for the island.

Maintaining the continuity and effectiveness of environmental education programmes over the long term is a challenge, especially in the face of political and economic changes.

5 CONCLUSION

Environmental education in Fernando de Noronha has been a great tool for protecting the environment and promoting sustainability. It plays a crucial role in preserving the archipelago's unique ecosystems and promoting sustainable practices, especially environmental care, which the Noronha community learns, assimilates and consequently passes on to tourists and new residents alike.

However, environmental education in Fernando de Noronha faces significant challenges, such as a lack of resources and pressure from tourism. To maximise the impact of environmental education, it is essential to develop robust public policies, strengthen local and international partnerships, and continuously invest in infrastructure and educational resources.

Environmental education also needs to include strategies for dealing with the impacts of climate change, which could directly affect the archipelago.

Even with a number of significant challenges, there is clear evidence of its positive impact and many examples of successful initiatives. It is important that there is continuous innovation, institutional support for its advancement, the implementation of stricter conservation policies, the expansion of educational programmes and international collaboration for research and environmental protection.

It would also be important to create a District Environmental Education Policy in Fernando de Noronha, establishing guidelines and principles for the promotion of environmental education.

Environmental education not only increases understanding of ecological processes and problems, but also inspires action and innovation, promoting a more sustainable and balanced future.

The objectives of this study have been met. Therefore, future research will investigate the

following topics:

- **Environmental education in local schools:** investigating how environmental education is integrated into the curriculum of schools in Fernando de Noronha and its impact on student awareness.
- **Community participation in environmental conservation:** analysing the role of the local community in environmental conservation and the promotion of sustainable practices.
- **Integrating regenerative economics into environmental education:** studying strategies for incorporating regenerative economics practices into environmental education.
- **Case studies and good practices in regenerative economics:** research examples from other regions that have successfully integrated regenerative economics into environmental education, as well as partnerships with non-governmental organisations, the government and the private sector that could be replicated in Fernando de Noronha.

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