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The relevance of private natural heritage reserves for biodiversity conservation and environmental protection

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A B S T R A C T

Global changes resulting from human intervention have profound and multifaceted implications for society and the environment. This paper aims to analyze the various dimensions and challenges related to environmental conservation, focusing on the importance of management plans, institutional partnerships, government support, community engagement, and environmental education. The research adopts an exploratory qualitative approach, using bibliographic and documentary research methods to examine scientific articles and relevant legal documents, such as laws and decrees. This study provides a comprehensive understanding of the concepts involved in environmental conservation, highlighting the significance of Private Natural Heritage Reserves (RPPNs) as crucial instruments for biodiversity preservation and the promotion of sustainable development.

Keywords: Sustainable Management; Conservation Units; Environmental Policies.

A relevância das reservas particulares do patrimônio natural para a conservação da biodiversidade e proteção ambiental

R E S U M O

As alterações no cenário global, resultantes da intervenção humana, têm implicações profundas e multifacetadas para a sociedade e o meio ambiente. Este artigo visa analisar as diversas dimensões e desafios relacionados à conservação ambiental, com foco na importância dos planos de manejo, parcerias institucionais, apoio governamental, engajamento comunitário, e educação ambiental. A pesquisa adota uma abordagem qualitativa exploratória, utilizando métodos de pesquisa bibliográfica e documental para examinar artigos científicos e documentos legais pertinentes, como leis e decretos. Este estudo fornece uma compreensão abrangente dos conceitos envolvidos na conservação ambiental, destacando a relevância das Reservas Particulares do Patrimônio Natural (RPPNs) como instrumentos cruciais para a preservação da biodiversidade e a promoção do desenvolvimento sustentável.

Palavras-chave: Gestão Sustentável; Unidades de Conservação; Políticas Ambientais.

La relevancia de las reservas particulares del patrimonio natural (rppn) para la conservación de la biodiversidad y la protección ambiental

R E S U M E N

Los cambios en el contexto mundial, derivados de la intervención humana, tienen implicaciones profundas y múltiples para la sociedad y el medio ambiente. Este artículo tiene como objetivo analizar las diferentes dimensiones y desafíos relacionados con la conservación del medio ambiente, haciendo hincapié en la importancia de los planes de gestión, las asociaciones institucionales, el apoyo gubernamental, el compromiso comunitario y la educación ambiental. La investigación adopta un enfoque cualitativo exploratorio, utilizando métodos de investigación bibliográfica y documental para examinar artículos científicos y documentos legales pertinentes, como leyes y decretos. Este estudio proporciona una comprensión global de los conceptos relacionados con la conservación del medio

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ambiente, destacando la importancia de las Reservas Particulares del Patrimonio Natural (RPPN) como herramientas esenciales para la preservación de la biodiversidad y la promoción del desarrollo sostenible.

Palabras clave: Gestión Sostenible; Unidades de Conservación; Políticas Ambientales.

1. Introduction

Transformations in the geographical space resulting from anthropogenic activities have caused profound and multifaceted impacts on both society and the environment. Human interference has led to substantial changes on the planet, including the replacement of native vegetation with expansive urban areas, the growth of agricultural and livestock activities, and intensive exploitation of natural resources.

Environmental problems have progressively become more frequent, intense, and complex (Schmitt et al., 2023). In Brazil, these transformation processes result in significant negative impacts, affecting the quality of life of communities by triggering health issues, scarcity of essential resources such as drinking water and food, and loss of livelihoods (Souto et al., 2019). Furthermore, environmental degradation compromises the availability of critical natural resources and essential ecosystem services. The destruction of ecosystems and pollution of water bodies, such as rivers, lakes, and oceans, adversely affects the quality and availability of these resources, undermining communities' ability to meet their basic needs.

In this context, the discussion on biodiversity conservation strategies has intensified, generating new approaches for environmental protection. Law No. 9.985 of July 18, 2000, which establishes the National System of Conservation Units (SNUC), is a significant milestone in this scenario. The SNUC categorizes different types of Conservation Units (UC), including protected areas managed by private entities with an interest in nature conservation. Among these categories, the Private Natural Heritage Reserve (RPPN) stands out, created in 1990 by Decree No. 98.914, later amended by Decree No. 1.922 of 1996, and currently regulated by Decree No. 5.746 of 2006 (Brazil, 2024).

Currently, Brazil has 1,567 RPPNs spread across various states. Of these, 698 are federal and cover a total area of approximately 890,000 hectares. The states with the highest concentration of RPPNs include Minas Gerais (350), Paraná (282), Bahia (157), Rio de Janeiro (152), São Paulo (99), and Santa Catarina (84) (Brazil, 2024). Most of these reserves are established by individuals, companies, and non-governmental organizations (NGOs) with the purpose of conserving biological diversity and ensuring the continuity of environmental preservation (Brazil, 2024).

Despite the progress made by the establishment of RPPNs, these reserves face significant challenges that may compromise their effectiveness. Key obstacles include the lack of financial incentives, inadequate technical resources, land conversion for alternative uses, deficiencies in monitoring, and issues related to policies and economics. Addressing these challenges is essential for promoting sustainable development and enhancing the effectiveness of RPPNs as tools for conservation and environmental preservation. Given these challenges, the central issue explored is how to ensure sustainable development and guarantee the effectiveness of RPPNs as instruments for nature conservation and environmental preservation.

Therefore, despite existing limitations, RPPNs play a crucial role in protecting nature and maintaining environments characterized by high biodiversity, ecological stability, and essential ecosystem services for human well-being. Thus, this paper aims to critically analyze the approaches, limitations, and potentials related to environmental conservation, with a focus on the importance of developing effective management plans. The study will discuss the advantages of such plans, as well as the relevance of partnerships and institutional support in their implementation. Additionally, the need for local community engagement and the importance of environmental education and awareness for promoting sustainable practices will be addressed.

2. Methodological Procedures

In developing the research, the methodological procedures adopted to address the study's objective are outlined, focusing on the research typology and the conditioning elements.

2.1 Research Typology

The research is exploratory and adopts a qualitative approach. According to Creswell (2007, p. 184), "qualitative research employs different claims to knowledge, investigation strategies, and methods of data collection and analysis." According to the author, these procedures contribute to research strategies, methods, and data analysis, as well as providing flexible and diverse research.

In this perspective, the research involves purposive and non-probabilistic sampling, based on criteria defined by the researchers. The availability of information and data accessibility are considered in both bibliographic and documentary research. Bibliographic research relies on previously prepared materials, such as books and scientific articles. In contrast, although similar to bibliographic research, documentary research is distinguished by the nature of its sources; while bibliographic research uses works from various authors, documentary research employs materials that have not been thoroughly analyzed or that can be reinterpreted according to the research objectives, in this case, addressing Conservation Units (UCs), specifically Private Natural Heritage Reserves (RPPNs).

When dealing with UCs in the classification of RPPNs, the research used sources related to the concept of Conservation Units, RPPN Management Plans, advantages, partnerships, and institutional support for RPPNs, local communities, and Environmental Education practices in RPPNs. Specialized websites on these topics and relevant laws and decrees were consulted for the study's foundation.

The applicability of the techniques for analyzing the collected data aims to determine if there is a correlation between knowledge and the reduction of aggression. Thus, these techniques were essential for ensuring robust and reliable results, with consolidated data for the research. The qualitative approach contributes to the literal preservation of data (Laville; Dionne, 2007).

Various techniques can be used for a qualitative exploratory approach, but this study was limited to two specific techniques: analytical description, which involves systematic and objective procedures that describe the content of messages, involving both the analysis of "meanings" (thematic analysis) and "signifiers" (such as lexical or procedural analysis). Descriptive treatment is an initial step in the process but is not exclusive for content analysis (Bardin, 2016).

Thematic analysis was chosen as the second technique for the research because it allows for understanding concepts and becoming familiar with the references and allusions used, aiming to listen and grasp without influencing the content of the described message (Severino, 2016).

Therefore, data analysis and interpretation do not conclude the research process; it is necessary to evaluate the value of the hypothesis, develop a framework that meaningfully explains the potential and limits, and identify new research horizons, constituting the final stage of completing the research (Laville; Dionne, 2007).

3. Results and Discussions

3.1 Conceptual Foundation of Conservation Units

The concept of a Conservation Unit (UC) designates a territorial area containing environmental resources and formally established by the Government. These areas have well-defined conservation objectives and geographically delineated boundaries (Brazil, 2000).

Conservation Units are classified into three administrative levels: municipal, state, and federal. They are further divided into two main groups: Integral Protection Conservation Units and Sustainable Use Conservation Units. Integral Protection Conservation Units are areas where permanent human presence is not allowed, with only direct use of natural resources permitted for scientific research and ecological tourism. In contrast, Sustainable Use Conservation Units allow for the presence of inhabitants and economic activities, provided they are compatible with the established conservation objectives (Brazil, 2026).

Specifically, there are five types of Integral Protection Conservation Units and seven types of Sustainable Use Conservation Units, as detailed in Table 01.

Table 01: Classification of Brazilian Conservation Units.

CLASSIFICATION OF CONSERVATION UNITS	
INTEGRATED PROTECTION	**SUSTAINABLE USE**
Ecological Stations (Esec)	Environmental Protection Area (APA)
Biological Reserves (Rebio)	Area of Relevant Ecological Interest (ARIE)
Parks (national, state, and municipal)	National Forests (Flona)
Natural Monuments (Monat)	Extractive Reserves (Resex)
Wildlife Refuges (RVS)	Wildlife Reserves (REF)
	Sustainable Development Reserves (RDS)
	Private Natural Heritage Reserves (RPPNs).

Source: Adapted by the author, 2024.

Thus, the classification of Conservation Units demonstrates that they do not represent a homogeneous set of protected areas, but rather comprise distinct categories that seek to establish specific characteristics of an environmental, social, cultural, and territorial nature. Therefore, understanding Conservation Units requires considering not only their designations, but also their objectives, forms of use and protection, and the presence of populations, aspects that should be associated with the management of each category presented in the table above (Heringer, 2025).

3.2 Research Focus on Private Natural Heritage Reserves (RPPNs)

The research chose to focus on Private Natural Heritage Reserves (RPPNs), which are defined by the Ministry of the Environment (2012) as Conservation Units of private ownership. These reserves are established with permanence in the owner's registry, with the primary goal of conserving biological diversity. RPPNs aim to contribute to the expansion of protected areas in Brazil and exhibit high effectiveness in conservation. Moreover, they are relatively simple to establish, facilitating private initiatives' participation in environmental preservation, thus strengthening the protection of fauna and flora in Brazil.

3.3 RPPN Management Plan

The Management Plan is an essential document that underpins the general objectives of a Conservation Unit (UC), delineating its zoning and establishing rules for area use and natural resource management. It also includes the installation of structures and necessary management, as provided by the National System of Conservation Units (SNUC) (Brazil, 2024).

This plan is crucial for both UCs and Private Natural Heritage Reserves (RPPNs) as it defines zoning areas, the potential implementation of physical structures, and methods for managing natural resources. It is developed based on a diagnosis of the RPPNs and their surroundings (Oliveira, 2022).

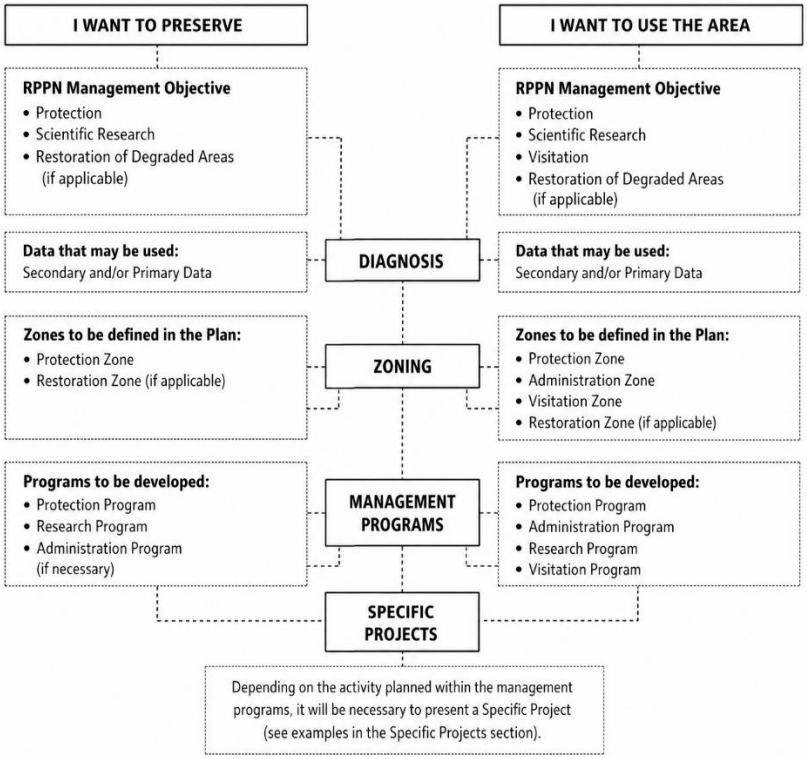
The primary goal of the Management Plan is to establish actions to be implemented in the Private Natural Heritage Reserve (RPPN) in a responsible, technical, and legal manner (Brazil, 2024). It serves as a fundamental managerial tool that supports the RPPN owner. To ensure its effectiveness, the preparation of the Plan must ensure, as stipulated by legislation (Brazil, 2015), that: a) it contributes to achieving the objectives established at the creation of the RPPN; b) it complies with permitted use and restrictions defined by current environmental legislation; and c) it prevents deviations and errors regarding its operation.

It is essential to note that the Management Plan defines the actions to be implemented in the RPPN, as stipulated by the SNUC Law, which requires all conservation units to have such a plan. The Plan must be prepared within five years from the creation of the unit and submitted to ICMBio for analysis and subsequent approval (Federal Law No. 9.985/2000).

The responsibility for the analysis and approval of the Management Plan lies with the Chico Mendes Institute for Biodiversity Conservation (ICMBio), which evaluates the quality of the managed information, the proposed objectives for managing the Private Natural Heritage Reserve (RPPN), the zoning, and the established rules (Brazil, 2024). Upon approval, the Management Plan is published in the Official Gazette, which grants legal recognition to the established rules. It is crucial to observe that the approval of the Plan does not exempt the owner from legal obligations and compliance with the programs established with the relevant environmental agencies and institutions (Brazil, 2024).

The Management Plan is a technical document that entails high costs and requires the hiring of specialized professionals for conducting surveys, diagnostics, and characterization, among other activities (Oliveira, 2022). However, ICMBio provides support through informative materials, guides, and methodological processes, guiding the development of the plan, as illustrated in Diagram 01 of the Management Plan preparation, based on the definitions provided by the RPPN owner.

Diagram 01: Definition of the RPPN Management Plan



Source: Methodological Guide for the Development of the Management Plan for RPPNs (2015).

According to Decree No. 5,746 of April 5, 2006, Private Natural Heritage Reserves (RPPNs) are established in private land areas through the competent authorities that are part of the National System of Conservation Units (SNUC). The official establishment of an RPPN at the federal level occurs through an ordinance issued by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) (Brazil, 2006). This process formalizes the reserve and ensures that private lands contribute to biodiversity conservation.

To create an RPPN, the landowner must commit to environmental conservation permanently by formalizing the reserve through property registration. If the owner decides to sell the property, the reserve remains registered at the registry office, following the procedures established by the Coordination of Conservation Unit Creation (COCUC) of the Chico Mendes Institute for Biodiversity Conservation (ICMBio) (Brazil, 2011). This mechanism ensures the continuity of environmental protection regardless of changes in property ownership.

In addition to legal obligations and commitment to conservation, the creation of an RPPN offers a range of benefits and incentives. These are detailed in Table 02, which illustrates the advantages of maintaining an RPPN. Among the main benefits are the possibility of accessing tax and financial incentives, participation in support programs, and collaboration with other conservation initiatives. These incentives are crucial for encouraging the establishment and maintenance of RPPNs, promoting greater engagement in environmental conservation by private landowners.

Table 02: Incentives and Benefits for an RPPN

INCENTIVES FOR CREATING RPPNs	BENEFITS OF CREATING AN RPPN
Be exempt from the Rural Land Tax (ITR)	Preserved property rights
Develop ecotourism and environmental education activities in a protected area recognized by the government	Exemption from the ITR for the area designated as RPPN
Formalize partnerships with public and private institutions	Priority in project analysis by the National Environmental Fund (FNMA), from the Ministry of the Environment (MMA)
Prevent urban expansion over natural and/or forested areas	Preference in the analysis of requests for agricultural credit loans with official credit institutions for projects to be implemented in properties that have an RPPN within their perimeter
Use the Reserve for marketing or status purposes	Opportunities for cooperation with private and public entities in the protection, management, and handling of the Unit

Source: Ministry of the Environment, Chico Mendes Institute for Biodiversity Conservation, Questions and Answers about PRIVATE NATURAL HERITAGE RESERVES, Brasília / DF, September / 2012.

Therefore, government incentives correspond to the provisions set forth in the Bill regulating the creation, management, and stewardship of Private Natural Heritage Reserves (RPPNs). Accordingly, Article 2 provides the basis for information related to biodiversity conservation, as well as activities and practices focused on environmental education, scientific research, and ecotourism, thereby contributing to the strengthening of environmental conservation. According to the legislation, an RPPN may be established voluntarily and at the initiative of the property owner, subsequently receiving official recognition from the public authorities. Furthermore, the legislation reinforces the importance of these reserves by recognizing them as areas of public and social interest, highlighting their contribution to nature conservation and biodiversity protection (Brazil, 2019).

3.4 Benefits and Incentives of Private Natural Heritage Reserves (RPPNs)

After the establishment of a Private Natural Heritage Reserve (RPPN), the landowner is exempt from paying property taxes, such as the Rural Territorial Tax (ITR), and has the opportunity to secure funds for environmental conservation projects. Additionally, municipalities benefit from the creation of RPPNs as it allows them to access state resources through the Institute of Nature Conservation (ICN) (Brazil, 2020).

The creation of an RPPN also provides access to additional state resources through the Environmental Tax on the Circulation of Goods and Services (ICMS) (Brazil, 2020). In RPPNs, activities related to environmental education, tourism, recreation, and research can be developed, provided they are authorized by the landowner and in accordance with the management plan. RPPNs undertake significant responsibilities, including the protection of water resources, management of natural resources, scientific research, and maintenance of climatic and ecological balances.

3.5 Environmental Education and Sustainable Practices in RPPNs

In Brazil, Law No. 9,795 of April 27, 1999, establishes the National Environmental Education Policy (PNEA), providing the legal foundation for the implementation of Environmental Education across the country. This law outlines the principles, goals, and guidelines necessary to meet the Environmental Education standards established at international conferences focused on planet preservation (Brazil, 1999).

Environmental Education is an interdisciplinary field aimed at raising public awareness about environmental issues, encouraging sustainable practices, and preserving natural resources. It is characterized by a dialogical, theoretical, and practical approach, promoting the production and sharing of knowledge applicable to practical activities.

In RPPNs, Environmental Education can play a crucial role in biodiversity conservation, promoting the sustainability of these protected areas. Environmental Education in RPPNs can be implemented through activities involving the local community, visitors, researchers, and educators. Examples of such activities include interpretive trails, awareness lectures, volunteer programs, and partnerships with schools and universities. These initiatives are essential for raising awareness about the importance of environmental preservation and encouraging active community participation in conserving natural resources.

3.6 Interpretive Ecological Trails

Interpretive ecological trails are guided paths that not only convey knowledge but also offer experiences that highlight the meanings and characteristics of the environment. These trails use direct experiences and illustrative means, becoming a valuable pedagogical tool for outdoor education programs (Possas, 1999).

Ecological trails serve as a pedagogical tool that transforms natural areas into real outdoor classrooms. They stimulate participants' interest, curiosity, and discovery abilities, enhancing knowledge about nature and emphasizing the importance of conserving natural environments.

According to Silva (2013), ecological trails are closely related to environmental conservation aspects. By facilitating people's access to natural environments, these trails promote changes in human behavior towards the environment. Thus, trails are part of conservation and preservation activities and generate interest in environmental issues. Tuan (1979), Lima (1997), and Guimarães (2007) observe that interaction with nature and human resilience to environmental adversities influence the perception and adaptation to risks associated with landscapes.

Activities related to natural trails bring humans closer to nature and promote well-being, encouraging the pursuit of ecological balance. These experiences positively contribute to the relationship between humans and the environment, fostering cooperation, socialization, and integration of various forms of knowledge,

including scientific and traditional.

3.7 Awareness Lectures and Volunteer Programs

Awareness lectures and volunteer programs are crucial tools for promoting practices aimed at raising public awareness about Private Natural Heritage Reserves (RPPNs). These actions are fundamental for integrating theory and practice, utilizing individual capabilities and educational and operational tools. Lectures on Environmental Education (EE) in RPPNs can promote the conscious use of sustainable practices and ensure sustainable development (Delgado, 2000).

According to Delgado (2000), lectures are a complex interpretive technique, while Moreira (2014) argues that, when conducted informally, they can communicate information clearly and objectively. Lectures may include field guidance, visits, video presentations, and classroom discussions, facilitating participants' understanding. To ensure the effectiveness of lectures, it is recommended that they last no more than one hour, cover engaging and relevant topics, and be tailored to the target audience according to age (Delgado, 2000).

Suggested lecture topics include: "Introduction to RPPNs: Importance and Legislation," "Biodiversity in RPPNs: Flora and Fauna," "Sustainable Management of RPPNs," "Environmental Education: Theory and Practice in RPPNs," and "Community Engagement and Volunteering in RPPNs." These topics significantly contribute to the conservation of RPPNs, biodiversity preservation, and quality of life improvement.

Volunteer programs, as permitted by Federal Law No. 9,608/98 (Official Gazette), can assist in the management and handling of RPPNs, strengthening them through a participatory model. These programs promote social values and beliefs, empower citizens to address environmental issues, and enhance the environmental and cultural heritage of RPPNs (FF-SP, 2010). Volunteering plays a fundamental role in preserving natural environments and fostering mutual collaboration between Conservation Units and volunteers, providing benefits to both parties and promoting cooperation and integration of different knowledge (Castro, 2002).

3.8 Partnerships with Schools and Universities

Law No. 9,795/99 of April 27, 1999, establishes the National Environmental Education Policy (PNEA), providing a legal framework for environmental education initiatives. This law promotes collaboration between the government, the private sector, and civil society, which is essential for the effectiveness of environmental education actions in RPPNs. The integration provided by this legislation allows RPPNs to access programs and resources focused on environmental education, expanding their conservation and awareness efforts (Brazil, 1999).

Article 225, item VI, of the Federal Constitution of 1988, which addresses the promotion of environmental education at all levels of education and awareness about environmental preservation, underpins the implementation of environmental themes in school curricula. This approach may include practical activities, artistic experiences, extracurricular activities, and the production of materials that encourage and support environmental policy (Sato, 2002).

According to Júnior (2013), Environmental Education is crucial for implementing educational measures aimed at environmental awareness. Schools should be involved in nature conservation projects and campaigns, addressing the role of scientific knowledge and the importance of these practices for the environment.

In Higher Education Institutions (HEIs), universities and colleges play a vital role in training aware citizens and professionals equipped to tackle environmental challenges. HEIs promote teaching and learning, preparing students for future professional practices and encouraging the search for alternatives and solutions to environmental issues. The number of higher education courses related to environmental themes, such as environmental education, environmental management, and environmental law, has increased significantly

(Reis et al., 2005).

Although Environmental Education in higher education is still an evolving field, there is a pursuit for an epistemological link that responds to the needs for affective inclusion in higher education (Santos; Sato, 2006). The initial focus on traditional courses, such as engineering, biology, and geography, in the 1970s and 1980s, has given way to a broader integration of environmental issues in postgraduate courses, including master's and doctoral programs, as well as environmental projects and themes. Thus, the implementation of courses or disciplines focused on nature preservation and conservation is essential for fostering critical and innovative thinking and promoting awareness about protecting natural environments.

4. Conclusions

Private Natural Heritage Reserves (RPPNs) play a crucial role in biodiversity conservation and the protection of natural ecosystems on private lands. These protected areas provide essential refuges for various endangered species and preserve native vegetation. To realize the full potential of RPPNs, it is essential to implement effective public policies, rigorous enforcement, robust financial support, government incentives, and the adoption of sustainable practices. Active participation from the local community is also indispensable to ensure the effectiveness of these actions and to achieve common environmental preservation goals.

Additionally, RPPNs offer significant opportunities for raising public awareness through Environmental Education (EE), promoting tourism activities, scientific research, and ecological trails. These initiatives not only provide economic, social, and environmental benefits but also contribute to community engagement in environmental protection. Educational programs in schools and community workshops can enhance public involvement in conservation, increasing the number of people committed to environmental protection.

Guided tours in RPPNs, integrated with sustainable tourism, represent an effective strategy to promote economic growth while advancing environmental conservation. Partnerships with higher education institutions can stimulate scientific research within these conservation units, offering opportunities to investigate and characterize species, as well as to develop innovative proposals and solutions for the conservation of these areas.

However, it is crucial to recognize that, despite their private origins, RPPNs have a collective impact on environmental conservation. The shared responsibility between landowners and society ensures that practices implemented in RPPNs contribute to maintaining biodiversity and creating a network of benefits that strengthens the conservation of natural environments. In this way, we ensure a more sustainable and promising future for the biodiversity and ecosystems protected by these reserves.

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