

EXPLORING THE POTENTIAL OF JAVA MOUNTAIN FLORA COLLECTIONS AS INTERPRETIVE MATERIALS FOR TOURISM AT THE BATURRADEN BOTANICAL GARDEN

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Article Info	Abstract
Keywords: Baturraden, conservation, ecotourism, tourism interpretation Received: April 08, 2026 Approved: April 18, 2026 Published: May 29, 2026	Baturraden Botanical Garden is an ex-situ conservation area that have crucial role in the preservation of Javanese mountain flora, particularly endemic species such as <i>Nepenthes adrianii</i>, <i>Scutellaria slametensis</i>, and <i>Homalomena bellula</i>. This research aimed to explore the potential of this flora collection as material for guided tours and to design an appropriate interpretation concept aligned with tourist characteristics. This research methodology employed a qualitative descriptive approach through interviews, observation, and literature review. The results indicate Baturraden Botanical Garden possesses 722 plant species arranged taxonomically and thematically. Tourists are predominantly from the 17–27 age group, consisting mainly of students who tend to favor educational activities. Therefore, the most suitable interpretation technique is direct interpretation through guided walk with an educational and interactive approach. The guiding material focuses on introducing endemic flora and conservation values to enhance environmental awareness. The main constraints in implementing interpretation include limited human resources and the absence of certified guides. Findings of this study affirm that flora collection holds significant potential as a medium for conservation education and as a reinforcement of the destination's image as a sustainable ecotourism destination.

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INTRODUCTION

Tourism in Indonesia encompasses a wide variety of activities, one of which is ecotourism. Ecotourism refers to tourism activities that provide numerous benefits, such as funding sources for conservation, protection of areas, alternative income for local communities, and promotion of conservation efforts (Page & Dowling, 2001). Ecotourism activities are guided by three main principles including conservation, local community participation, and education.

The Baturraden Botanical Garden (BBG) officially commenced operations in 2015 and located in Kemutug Lor Village, Baturraden District, Banyumas Regency. BBG features a collection of characteristic flora from the Java mountains. Several types of collections at BBG are endemic to Mount Slamet, including *Nepenthes adrianae* and *Homalomena bellula*.

The Ministry of Tourism of the Republic of Indonesia (2024) recorded that tourists originating from Central Java in 2024 numbered 131,803,213. This figure represents an increase of 15.25% compared to the number of tourists in 2023, which was 114,358,219. The rise in tourist numbers presents an opportunity for BBG to conduct tourism activities. BBG can serve as a platform to promote environmental awareness and conservation education to domestic tourists, particularly those from Central Java.

The conservation and environmental education values embedded in BBG's flora collections need to be conveyed to tourists as recipients of environmental services from ecotourism activities. To achieve this, tourism interpretation serves to connect ecotourism values to tourists. Tourism interpretation is a form of communication that facilitates visitors' understanding of information about a tourist object in a simple and accessible manner (Nugroho, 2020). Tourism interpretation can be conducted through various media, either directly or indirectly (Tsaniah et al., 2022). This interpretive process requires appropriate conceptual and thematic designs aligned with ecotourism principles.

Thematic design in interpretation is crucial for ecotourism activities. Such designs are useful for delivering educational messages in a coherent and comprehensible manner, enabling tourists to understand knowledge about the characteristic flora of the Java mountains at BBG. An appropriate theme also enhances conservation effectiveness through narratives that foster tourists' awareness of environmental preservation (Al Idrus et al., 2025). Themes are specifically designed to improve the quality of tourism experiences, build connections between tourists and destinations, and increase tourist satisfaction. Well-crafted interpretive themes can strengthen the identity and competitiveness of destinations, facilitate promotion, and encourage the involvement of various stakeholders in the sustainable management of ecotourism. Hence, this research seeks to assess the potential of botanical diversity in BBG for interpretative development and to formulate an appropriate interpretative framework tailored to both the site's intrinsic attractions and visitor characteristics.

Previous studies have primarily focused on the comprehensive management of botanical gardens (Irawanto, 2023; Purnomo et al., 2015) or the exploration of specific plant species within their collections (Puspitaningtyas, 2002; Yuniarty et al., 2020). Additionally, extant research has addressed the tourism attractiveness of botanical gardens (Nugraha & Irlani, 2023; Siahaan & Widiastuti, 2022; Yulianti et al., 2020) alongside visitor-centric aspects

such as perception, satisfaction, and travel motivation (Syafitri et al., 2019; Wulandari et al., 2019; Yorika et al., 2021). However, studies integrating floral collections with visitor characteristics remain limited. This research provides a holistic discussion to bridge the potential of botanical gardens, specifically their floral diversity with visitor characteristics as the stakeholders utilizing this potential within the framework of ecotourism. Furthermore, this study offers practical recommendations on how the inherent potential of botanical gardens can be communicated to visitors through effective interpretation.

METHODS

Research Design

This study adopts a mixed-methods research design, integrating qualitative approaches with simple quantitative analysis to obtain data that are more comprehensive, valid, reliable, and objective (Sugiyono, 2016). Mixed methods are widely utilized in research concerning the exploration of tourism attractions and the formulation of development strategies for tourist destinations (Artana et al., 2026; Efendi, 2022).

Data Collection and Analysis

Data collection was conducted from June to September 2024, encompassing both weekdays and weekends. Data collection utilized interview techniques, direct observation, and literature study. Primary data were obtained through interviews and direct observation. Interviews with tourists were assisted by an instrument in the form of a semi-structured questionnaire. This questionnaire was used to obtain data regarding the characteristics of tourists at the Baturraden Botanical Garden. Literature study was employed to acquire secondary data as supporting data in this research.

The collected data were analyzed using a qualitative approach supported by descriptive statistics to present information regarding visitor profiles and characteristics. The potential of the floral collection was analyzed by highlighting specific species with high ecological value and aligning the arrangement of the collection with the proposed interpretation techniques. The analysis of the interpretation design refers to the AIDA framework (Nuaba et al., 2024; Wei et al., 2022), which was operationalized into a series of biodiversity interpretation activities at the Baturraden Botanical Garden.

Population and Sample

The population comprises the entirety of research objects possessing specific quantities and characteristics designated by the researcher for investigation and generalization (Arikunto, 2010). In this study, the target population consists of individuals who have visited the Baturraden Botanical Garden.

The sample represents a subset of the total research objects deemed to reflect the characteristics of the entire population (Notoatmodjo, 2010). The sample size adheres to social research conventions requiring a minimum of 100 to 200 respondents (Jogiyanto Hartono, 2018). This study utilized 100 visitors as respondents, assuming this figure sufficiently represents the actual conditions. Participant selection employed an accidental sampling

technique. It should be noted that the accidental sampling technique is susceptible to potential bias and lacks generalizability (Sugiyono, 2016). To mitigate these limitations, complementary methods such as interviews and literature reviews were employed to triangulate and support the data obtained through accidental sampling.

RESULT AND DISCUSSION

Potential of Baturraden Botanical Garden's Flora Collection

Baturraden Botanical Garden (BBG) focuses on the conservation of Javanese montane flora species, a focus supported by its location at the foot of Mount Slamet. The favorable geographical and environmental conditions further designate BBG as an ex-situ conservation site for Javanese montane flora. BBG's flora collection can be packaged into a tourist attraction for visitors in the form of interpretive tourism.

BBG was established as a conservation site for various Javanese montane flora, particularly endemic species of Mount Slamet. The total plant collection consists of 722 species and 3,293 specimens. This collection was acquired through various methods: propagation, exchange of collections, and exploration in native habitats. To date, BBG has conducted plant explorations to various locations across Java Island, as presented in Table 1.

Table 1. Plant Exploration Site of Baturraden Botanical Garden

No.	Province	Exploration Location
1	West Java	Mount Ciremai, Mount Tilu
2	Central Java	Mount Slamet, Mount Merbabu, Mount Prau, Mount Bisma, Petungkriyono Area, Mount Ungaran, North Mount Lawu, Mount Kumbang, Pringombo I—III Nature Reserve
3	Special Region of Yogyakarta (DIY)	Mount Merapi, Menoreh Hills
4	East Java	South Mount Lawu, Mount Welirang, Mount Arjuna, Mount Wilis, Mount Kelud

Source: Research data, 2024

In line with the collection theme, "Javanese Montane Flora," and its location on the slopes of Mount Slamet, BBG possesses several important species that represent the characteristic features of the area. These include endemic species that naturally occur only in one region or are characteristic of a specific area. While endemic species constitute a small percentage of the total BBG collection compared to other types, their high rarity and vulnerability in their native habitats assign them a high ecological value. BBG's collection includes the following species endemic to Mount Slamet.

Nepenthes adrianii

Indonesia is home to 64 *Nepenthes* species. The largest centers of pitcher plant distribution in Indonesia are Kalimantan (32 species) and Sumatra (29 species), with others spread across Sulawesi, Papua New Guinea, Maluku, and Java (Rosmaina & Zulfahmi, 2011). BBG has a total of 8 *Nepenthes* species, one of which is *Nepenthes adrianii*, an endemic species of Mount Slamet. This species is the most numerous among BBG's pitcher plant collection. This is due to BBG's proximity to the native habitat of *N. adrianii* in the Mount Slamet highlands, providing optimal conditions for cultivation.

The *N. adrianii* species is capable of producing the organic compound ethyl acetate. With certain processing and treatments, this compound can help inhibit the growth of oral cancer cells (Tang et al., 2019; Peng et al., 2020). A major threat to *N. adrianii* in its native habitat is collection by local residents for use as ornamental plants and subsequent sale. *N. adrianii* is listed under CITES Appendix II, meaning that international trade of wild specimens must be strictly controlled and requires special permits. Furthermore, all pitcher plant species, including *N. adrianii*, are classified as protected plants under Government Regulation No. 7 of 1999 concerning the Preservation of Plant and Animal Species.

***Scutellaria slametensis* Sudarmono & Conn**

The genus name *Scutellaria* refers to a small dish, tray, or plate, as the plant has a small, dish-like calyx. *Scutellaria slametensis* is a flowering plant species belonging to the Lamiaceae family. Morphologically, it resembles *S. javanica*. The distinguishing features are the light blue-purple calyx color (dark purple in *S. javanica*) and the longer, attenuated leaves at the base (Sudarmono & Conn, 2010).

***Homalomena bellula* Schott**

Homalomena bellula Schott is commonly known as the endemic *talas* (aroid) of Mount Slamet. This species is classified as Vulnerable according to the IUCN. The uniqueness of *H. bellula* lies in its tuber growth pattern, which differs from other *Homalomena* species, resembling the growth pattern of ginger (*Zingiberaceae*) species. The species was rarely found in nature after its discovery and publication by Schott in 1863 in Java, until a new location for its distribution was found in the Pancuran Tujuh area at the foot of Mount Slamet, Baturraden, Central Java. The presence of this species in its habitat is a concern, and *ex-situ* conservation efforts are needed to support its preservation (Yuzammi, 2019).

Collection Management

The study of morphological variations among species in the Baturraden Botanical Garden is closely linked to the operational management framework, encompassing inventory and documentation. The diversity of vegetative and generative forms constitutes the primary parameter for grouping plant species into collection zones that align with their respective ecological requirements. Collection management at BBG, including planting and arrangement, utilizes taxonomic and thematic grouping. This comprises 8 taxonomic and 7 thematic patterns, as detailed in Table 2 below.

Table 2. Planting Patterns and Arrangement of the Plant Collection of Baturraden Botanical Garden

No.	Taxonomic Pattern	No.	Thematic Pattern
1	Orchidaceae (orchids)	1	Flora of Java Garden
2	Lauraceae (camphor-likes)	2	Medicinal Garden
3	Myrtaceae (myrtles/guavas)	3	Fern Garden
4	Euphorbiaceae (spurges)	4	Bamboo Garden
5	Araceae (aroids)	5	Liana Garden
6	Sapindaceae (soapberries)	6	Gum Garden

No.	Taxonomic Pattern	No.	Thematic Pattern
7	Nepenthaceae (pitcher plants)	7	Useful Plants
8	Meliaceae (mahogany/duku-likes)		

Source: Research data, 2024

This arrangement facilitates monitoring and maintenance by staff, while also making it easier for visitors to enjoy the plant collections. Thematic gardens are located along the main pathway, easily accessible with clear signboards. Collections arranged by taxonomic patterns are placed in specific areas, such as planting plots or greenhouse buildings.

Overall, the BBG area is a habitat for 30 orchid species, including both epiphytic and terrestrial types. The facilities for maintaining and propagating specific orchid species are a prominent attraction at BBG. This facility is a greenhouse, commonly known as the Orchid Greenhouse. Visitors can tour the Orchid Greenhouse to admire the orchid collection, accompanied by staff. The number of visitors and visiting time are limited to preserve the collection and prevent damage.

The management also uses flora to create an artificial attraction for tourists in the form of a flower bed. A flower bed is an artificial garden with an arrangement of flowers forming a configuration. Visitors can walk through the beautiful flower configuration and take pictures (Manalu & Kurniawan, 2021).

Based on Middleton et al. (2009) classification of tourist attractions, BBG has integrated natural attractions (rich flora and beautiful landscape) with artificial attractions like the flower bed. The integration of natural and artificial attractions can expand the market segmentation and strengthen the overall tourist appeal. This integration also enriches the visitor experience, offering not only natural beauty but also interactive, educational, and memorable experiences (Romadhan & Nugroho, 2021). A similar approach is implemented at Purwodadi Botanical Garden, which combines natural attractions, such as the giant corpse flower collection, with artificial attractions like thematic gardens and camping ground (Reswari et al., 2025).

Characteristics of Baturraden Botanical Garden Visitors

The successful maintenance of plant collections at the Baturraden Botanical Garden as an ex-situ tourism asset is closely linked to the profile of the audience interacting with these collections. Identifying visitors' characteristics provides a comprehensive overview of the societal backgrounds of individuals utilizing the botanical garden's management outcomes as a medium for knowledge acquisition.

1. Age

Visitors to BBG are predominantly in the 17–27 age group (75%), suggesting that the botanical garden is mainly favored by teenagers and young adults. The majority of visitors come in small groups of 2–5 people per visit. Groups with mixed age ranges typically consist of one family.

2. Origin

The Baturraden area is a major focus for tourism in Banyumas Regency. Increased information about various tourist attractions in Baturraden has drawn visitors from

different regions. The variety of attractions in the Baturraden area allows visitors to choose destinations based on their preferences.

BBG visitors are dominated by local visitors from Banyumas Regency (56%), followed by tourists from neighboring regencies, such as Cilacap, Purbalingga, and Banjarnegara. The relatively short distance from their origin results in minimal travel costs, which is a reason for many visitors from these areas to visit BBG. Visitors from outside the province are generally observed on weekends.

3. Education Level

Consistent with the age distribution, the education level of BBG visitors is dominated by high school graduates (49%), followed by university graduates (S1/bachelor's degree) (30%), and junior high school graduates (SMP) (13%). The visitors' education level is important in determining their ability to process information, interpret, and appreciate the attractions at BBG. Students and university students tend to seek new experiences (Dwiputra, 2013). Education is also a factor that influences the formation of perceptions and behavior toward a place, including a tourist destination. A higher education level generally correlates with broader knowledge and cognitive ability to understand the value, function, and impact of tourism activities. Highly educated tourists tend to exhibit more responsible behavior in maintaining cleanliness and environmental sustainability (Fridayati, 2021). The dominance of visitors with high school to university education levels should be a consideration for management in adjusting the communication strategy between interpreters and visitors, and in preparing suitable tourist guiding materials for effective information delivery.

4. Occupation

The majority of BBG visitors are students/university students (31%), followed by private employees (24%), and entrepreneurs (21%). Occupation is related to travel in several ways such as determining the duration of the visit, disposable income, and the motivation to explore new places or seek entertainment and new experiences (Manalu & Kurniawan, 2021).

5. Type of Activity

Visitor activities at a tourist destination are influenced by the available attractions and facilities. Most BBG visitors engage in enjoying the scenery (52%) and taking photos (39%). Enjoying the scenery is the simplest and easiest activity. Visitors can appreciate the landscape beauty of BBG from various points. The management provides facilities such as gazebos and a viewing tower for visitors to observe the scenery more freely. The beautiful panorama is also a specific draw for photography. Besides personal photos, professional photoshoots, such as for pre-wedding documentation, were also observed during data collection. A small portion of visitors also use the BBG area for exercise.

6. Source of Information

Visitor numbers at a tourist area are linked to the dissemination of information for promotion and marketing. The source of information is a link between the destination

and potential visitors. The main source of information leading to the decision to visit BBG is friends/family/other people (50%), indicating that the word-of-mouth (WoM) phenomenon remains an effective means of information dissemination. WoM is defined as the exchange of comments, thoughts, or ideas between two or more consumers (Mowen et al., 2002). WoM is considered capable of generating a significant relationship with visiting interest (Kumala, 2012) and visiting decisions (Aulia, 2013).

Another source of information used by 42% of BBG visitors is social media and the internet. Information about the Botanical Garden's attraction comes from both the management and the visitors themselves. BBG management utilizes Instagram and its website as promotional tools and information dissemination channels. Furthermore, visitors act as information sources by uploading documentation of their visits to BBG onto their personal social media, reaching others without distance limitations.

Interpretation Strategies

Developing effective interpretation strategies necessitates a transition from conventional lecturing to more adaptive and interactive methods, particularly when targeting the younger segment. The following discussion elaborates on the strategic utilization of both human-led guidance and digital media to foster a deeper connection between visitors and the ex-situ collections.

1. Adaptive Scientific Communication

The dissemination of rigorous scientific facts needs adaptive communication strategies to effectively engage younger target audience. The AIDA (Attention-Interest-Desire-Action) model serves as a fundamental framework for developing these communication strategies, where each component must be successfully achieved to ensure optimal information delivery.

The Attention component is considered successful when visitors become aware of the availability of tour guides prepared to provide essential information regarding plant collections. This is implemented through direct offerings of guiding services by personnel at the initial point of arrival. The Interest component reflects the visitors' engagement with the information presented by the guide. Teenage visitors require sequential information input; preliminary information should consist of general and accessible facts, such as the etymology of plant names, followed by more specialized information, including scientific nomenclature and biological properties. Subsequent information may involve more complex scientific data, such as the specific benefits of certain plant species and the corresponding processing methods. The Desire component involves the cultivation of the visitors' inclination to seek further technical and practical knowledge regarding the interpretation objects, such as identifying the characteristics of *Nepenthes* (pitcher plants) ready for harvest. The utilization of visual aids, including images or videos, is employed to stimulate this desire among adolescent tourists. The final component, Action, must be aligned with the background of the teenage visitors, manifested through practical activities commensurate with their

knowledge and capacity, such as planting, maintaining, and conserving the interpretation objects.

2. Digital Interpretation Media Strategies

The lack of tour guides can be mitigated through indirect interpretation supported by digital media, particularly for independent visitor without guided assistance. Given that visitor activities are predominantly centered on photography, existing attractions—such as conventional photo spots—can be enhanced into scientifically-themed installations by integrating visual displays of scientific facts related to the interpretation objects. To facilitate independent visitors who do not utilize guiding services, QR codes can be positioned at strategic interpretation points. These QR codes provide easily accessible information via the visitors' personal devices.

Design of Tourist Guiding Material at Baturraden Botanical Garden

Analysing visitor characteristics is crucial in designing interpretive materials because it determines the relevance, comprehensibility, and impact of the message on visitor behavior. By understanding visitor motivations, backgrounds, and expectations, the interpretive material designer can tailor the content and style of delivery to be more meaningful for each audience segment. This approach has been shown to increase the emotional and cognitive connection between the interpretive message and the visitor experience (Sun et al., 2024). Moreover, adjusting for the visitors' cognitive background, cultural values, and language ability plays a vital role in encouraging deeper understanding and positive attitude changes toward conservation and environmental preservation (Hadinejad et al., 2024).

Segmenting visitors based on motivation and behavior also helps management determine the most effective interpretive media, such as using simple visual boards for families or augmented reality technology for younger, tech-savvy tourists (Lee & Kim, 2023). Utilizing digital data and social media enables the development of adaptive and personalized interpretive materials, strengthening relevance and communication efficiency (Gao & Yu, 2024).

1. Guiding Technique

Referring to BBG's attraction, which is its flora collection, the most effective guiding technique is direct interpretation. Direct interpretation is face-to-face communication aimed at connecting visitors with the values of the interpretive object at the tourist destination. Forms of direct interpretation include guided walks or tours, storytelling, field demonstrations, and participatory activities such as flora and fauna observation. The interpreter acts as a facilitator who links scientific knowledge with local values to enhance the visitor experience (Moscardo & Hughes, 2023). Direct interpretation is effective in building visitor understanding and emotional involvement because the material delivery is directly tailored to visitor characteristics (Nowacki, 2021)

The success of interpretation is also determined by the language used to convey information. The language used for direct interpretation at BBG should be educational and persuasive so that visitors gain environmental education and awareness of the importance of flora conservation. In accordance with the tourist guiding code of

ethics, the language style must not contain elements of SARA (Suku, Agama, Ras, Antargolongan/Ethnicity, Religion, Race, and Intergroup relations). Although visitors are dominated by students/university students from the surrounding area, interpreters are not permitted to use the local language entirely. The local language may be used outside the core interpretive material delivery, such as when welcoming visitors. Information delivery is also supported by the interpreter's body language. Body language aims to control the focus and attention of visitors, whether to view the object directly or focus on the interpreter's explanation.

2. Interpretive Material

Interpretive material emphasizes the flora collection at BBG. Based on the *guided walk* interpretation method, the material delivered will be adjusted to the objects encountered. The arrangement of the collection in thematic gardens facilitates the specific division of material. The interpreter must emphasize material concerning the flora collection that is characteristic of BBG and has high conservation value.

Several endemic flora species, such as *Nepenthes adrianii*, *Scutellaria slametensis* Sudarmono & Conn, and *Homalomena bellula* Schott, are located in the same area. The interpreter can present material on the introduction of these species simultaneously. Besides the thematic gardens and the cluster of endemic species, the orchid greenhouse is an artificial attraction at BBG that requires specific material.

The material an interpreter can deliver to visitors regarding the flora collection includes the species' specifications, habitat characteristics, cultivation techniques, and the ecological value of each species, as outlined in Table 3.

Table 3. Design of Interpretive Materials for the Flora Collection of Baturraden Botanical Garden

Stage	Activity	Material
Opening	Welcome and activity introduction	Introduction to Baturraden Botanical Garden area, including Destination general description, Destination history, Destination function, General explanation of <i>ex-situ</i> conservation
Field Interpretation	Guided walk	Flora species introduction: Species name, Flora habitat, Flora cultivation/propagation techniques, Flora uniqueness value, Flora rarity value, Flora benefit value
	Interactive Education	Flora observation: Simple morphology (leaf shape, stem, flower, fruit, etc.), Simple planting/propagation methods, Introduction to tools and materials, Simple planting demonstration
	Hands-on Experience	• Technical procedures encompassing the cultivation, maintenance, and conservation of plant species • Interactive role-playing as scientist or biologist were implemented to enhance the interpretative experience
Evaluation	Discussion/Q&A	Material presented during the field interpretation activity
Closing	Biodiversity preservation campaign	• Importance of participation in biodiversity conservation activities • Visitors are provided with gardening starter kits, including plant seedlings and essential tools, to encourage practical involvement

Source: Research data, 2024

In addition to conveying interpretive material, the interpreter is tasked with ensuring visitors have an increase in understanding, knowledge, and conservation awareness. This is done by the interpreter opening a Q&A session and asking questions about the attraction. Visitor responses are used as a reference for the interpreter's evaluation in preparing material for future tourism activities.

Constraints

The implementation of interpretive activities at the Baturraden Botanical Garden faces several constraints. Currently, the destination lacks certified professional interpreters. Furthermore, the visitor information center is not yet functioning optimally, resulting in limited visitor awareness regarding the availability of interpretive services. Digital interpretive media are also unavailable on-site. Their procurement involves a lengthy administrative process, given that the Baturraden Botanical Garden operates under the management of the local government.

CONCLUSION

The floral collection of Baturraden Botanical Garden represents a dynamic educational asset that, when synthesized with strategic interpretation, shapes the destination's conservation identity. This study underscores that effective interpretation must bridge the gap between biological diversity and visitor demographics specifically the dominant adolescent and young adult student cohorts by tailoring the depth of information to their cognitive and social interests. Practically, the successful revitalization of Baturraden's ecotourism relies on professionalizing human resources through certified guide training and modernizing delivery via digital interpretive platforms to overcome current constraints. Moving forward, while this research establishes the link between collection potential and visitor characteristics, future studies should employ longitudinal designs to measure the long-term impact of specific interpretive techniques on visitor pro-environmental behavior and the economic sustainability of the tourism destination.

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