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Integrative theoretical model of sustainable tourism and integral health for the Guamuhaya Geopark, Cuba

Ángel Luis Camacho Gómez [1], Dr. Carlos Manuel Vilariño Corella [2], Dr. David del Valle Laveaga [3], Dr. Rigoberto Fimia Duarte [4*]

[1] General Director of the Topes de Collantes Tourism Complex, Trinidad, Sancti Spíritus, Cuba
[2] Faculty of Technical and Economic Sciences, University of Holguín, Cuba
[3] Parasitology Department. Regional High Specialty Hospital (HARE), Dr. Juan Graham Casasús, México
[4] Hygiene and Epidemiology Department, Faculty of Health Technology and Nursing (FHTN), University of Medical Sciences of Villa Clara (UMS-VC), Cuba

* Corresponding Author: **Dr. Rigoberto Fimia Duarte [4*]**

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Abstract
Although geoparks are recognized as models of geoconservation and local development, a consolidated conceptual framework that explicitly defines their potential as a health resource is lacking. The objective of this study was to propose an interdisciplinary theoretical framework that links the Guamuhaya Geopark in Cuba with sustainable tourism and the promotion of holistic health, thereby enabling the design of integrated public policies. Through documentary research, which combined a systematic review of literature on geoparks, sustainable tourism, and the nature-health link, including theories of attention restoration and stress reduction, with an analysis of Agreement 10240/2025 of the Council of Ministers of Cuba, an integrative model was constructed. This model posits geological heritage as a fundamental resource, mediated by sustainable tourism that generates benefits for the physical (physical activity, reduction of cardiovascular risk factors) and mental (stress reduction, improved mood) health of visitors, while simultaneously improving the social determinants of health in local communities through participatory governance. The framework integrates four constructs: geological heritage, sustainable tourism, holistic health, and local community, contextualized within the Cuban legal and policy framework. A set of theoretical hypotheses is derived for future empirical validation, and a conceptual basis is offered for designing health-oriented tourism management strategies in Guamuhaya. A graphic model illustrating the proposed relationships is presented. It is concluded that the Guamuhaya Geopark possesses therapeutic potential with ample opportunities for development, making it a potential benchmark for sustainable wellness tourism in the Caribbean.

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1. Introduction

The conservation of natural resources is a social and political process that has been developing steadily, primarily over the last two centuries, adapting to its vulnerabilities, needs, and the actors involved [1-3].

Geoparks are part of this pursuit of increasingly interconnected and participatory natural spaces [3,4,5]. Geoparks are territories with a geological heritage of paramount importance, integrated with landscape and cultural values, managed holistically, based on environmental conservation, earth science education, and the promotion of sustainable local economic development [6-8].

The concept of geoparks emerged in the mid-1990s as a response to the need for conservation and enhancement of certain areas of geological importance. However, it wasn't until 2000 that the first geopark network, the European Geoparks Network (EGN), was established. Subsequently, in 2004, with UNESCO support, the current Global Geoparks Network (GGN) was created, initially comprising 17 European geoparks and eight Chinese geoparks [8,9]. Crucially, in November 2015, the 195 Member States of UNESCO, at the UNESCO General Council, established the UNESCO Global Geoparks Programme, which currently includes 140 territories with this designation, distributed across 38 countries [3,8,10].

These precedents indicate that the use of geological resources as a source of sustainable economic development is showing an upward trend, which goes hand in hand with the implementation of geopark projects worldwide [11-13]. Nations in Europe and Asia are the main exponents of geoparks; in Latin America this process is not indifferent and there is a similar interest, despite it being a foreign model that needs contextual evaluation [2,3,13].

In Latin America, there has been a growing interest in developing new geopark projects, and more and more territories are interested in promoting them, given their significant geological, geomorphological, and scenic attributes; many of which are regional tourist icons [3,11,13]. These characteristics can be leveraged to promote geotourism strategies that improve the quality of life in rural communities, while also strengthening the cultural principles that shape the territory [5,10,11].

Geotourism has been conceived as a tourism modality distinct from mass tourism, with the purpose of highlighting the value of geological and geomorphological resources within a sustainable cultural and environmental context [8,14,15]. Geotourism emerged as an alternative for disseminating geological knowledge and ensuring that these resources are understood and interpreted for conservation purposes [16-18]. Thus, tourism linked to geological heritage, or geoheritage, has acquired a multidisciplinary and holistic definition that converges on three elements: geoeducation, geoconservation, and sustainable development [8,18,19]. Geotourism has therefore become an engine of economic and social growth for territories with geological heritage of particular rarity, beauty, or scientific importance [6,13,20].

Much of the protection and conservation effort has focused on flora, fauna, and fragile ecosystems, so geoheritage and abiotic elements have been underestimated and may be even more fragile than biological resources [16,17,21]. Geoheritage is equally important, encompassing geological formations and structures, rocks, fossils, soils, and features that reveal the origin and evolution of the Earth and life [22]. For this reason, many of these elements have a high capacity to absorb impacts from natural events or human activity, accelerating their need for protection [6,7,16].

Geotourism routes are conceived as a key strategy and tool for the interpretation and dissemination of geoheritage [23], as they contribute to the diversification of current tourism products [6,7,24]. These routes aim to connect sites of geological interest [SGI] with other sites of natural and cultural interest, creating a robust tourism offering that combines geology with biodiversity, culture, and ecology [10,25,26].

The creation of geotourism routes, geotrails, geoactivities, and guided visits to Sites of Geological Interest (LIG) contributes positively to the appreciation, conservation, and learning of geoheritage and geodiversity through Earth Sciences [18,23,27]. According to López *et al*. (2022) [28], these initiatives contribute positively to the geoscientific education of society, since tourists experience the attractions from a geological perspective. Therefore, they are able to recognize the different processes that shaped and gave rise to the current landscape [26,28].

The Guamuhaya Geopark, officially declared Cuba's third national geopark by Council of Ministers Agreement 10240/2025 [29], represents a milestone in the country's strategy for the conservation and enhancement of its geological heritage. Located in the Guamuhaya mountain range, covering 2,143 km² across the provinces of Cienfuegos, Villa Clara, and Sancti Spíritus, it encompasses five municipalities, 10 georoutes, and 50 geosites of scientific interest, of which seven have international value, nine national value, 22 regional value, and 12 local values. The territory is home to the Lomas de Banao Ecological Reserve, lake Hanabanilla, El Nicho, the Topes de Collantes Protected Natural Landscape, and national monuments such as Caballete de Casa and the Martín Infierno cave, giving it exceptional biological, historical, and touristic significance.

This proposed study is based on the need to move beyond fragmented perspectives that address geological heritage, sustainable tourism, and human health separately. While the Guamuhaya Geopark already has official recognition that promotes sustainable tourism based on the interpretation of its natural and cultural heritage, a consolidated theoretical framework that explicitly articulates the relationship between its geo-heritage values, the development of sustainable tourism, and its potential as a resource for promoting the overall health of visitors and local communities is still lacking. This conceptual gap limits the ability to design evidence-based management strategies that simultaneously maximize the benefits of conservation, socioeconomic development, and human well-being.

Therefore, the present study proposes as its general objective: to build an interdisciplinary theoretical framework that scientifically grounds the relationship between the Guamuhaya Geopark, sustainable tourism and the promotion of integral health, establishing the conceptual bases for future empirical research and for the design of integrated public policies.

The research question guiding this study is: How can a theoretical framework be articulated that links the geo-heritage values of the Guamuhaya Geopark with sustainable tourism and the promotion of holistic health? The scope of the study is theoretical-documentary, with a qualitative and exploratory approach, and is limited to the construction of the conceptual framework, without addressing the empirical validation of the proposed model at this stage.

1.1. Literature Review

The literature review is organized around three interrelated thematic axes: (a) geoparks as models of sustainable territorial management, (b) sustainable tourism in protected natural areas, and (c) scientific evidence on the benefits of nature for human health. This tripartite structure reflects the interdisciplinary nature of the research problem.

1.1.1. Geoparks: conceptualization, evolution, and regulatory framework

The geopark concept emerged in the late 1990s as a response to the need to protect geological heritage in a way that is integrated with sustainable local development. UNESCO defines a Global Geopark as a single, unified geographical area where sites and landscapes of international geological significance are managed under a holistic concept of protection, education, research, and sustainable development. This integrated approach goes beyond the traditional concept of protected areas, as it not only seeks the conservation of abiotic heritage but also links it to the ecological, cultural, and historical values of the territory, actively promoting the socioeconomic development of local communities.

In the Cuban context, the legal framework for the national geopark is established by Decree-Law 331 [30], "On Zones with Special Regulations" (2015), and Decree 11 [31], "On the Geological Heritage of Cuba" (2020), which outline the procedures for its declaration and management. The Guamuhaya Geopark is the third area declared under this designation, following the Viñales Geopark (2021) and the La Gran Piedra Geopark in Santiago de Cuba. The legal priority for geopark management is "the harmonious protection of Cultural and Natural Heritage, including Geological Heritage".

Specialized literature agrees that geoparks are distinguished from other protected areas by three fundamental pillars:

1. **Geoconservation:** The identification, protection, and monitoring of geosites of scientific, educational, and aesthetic value.
2. **Geoeducation:** The interpretation of geological heritage for diverse audiences, fostering scientific literacy and environmental awareness.
3. **Geotourism:** A form of sustainable tourism that combines the appreciation of geological heritage with educational, cultural, and recreational experiences, generating economic benefits for local communities.

However, recent research indicates that newly created geoparks, such as Guamuhaya often lack a consolidated model for the protection, conservation, and promotion of mixed (natural and cultural) heritage, which represents a significant challenge for their effective management.

1.1.2. Sustainable Tourism in Geoparks: foundations, models and challenges

The World Tourism Organization (UNWTO) defines sustainable tourism as tourism that "makes optimal use of environmental resources, maintaining essential ecological processes and helping to conserve natural resources and biological diversity," while respecting the sociocultural authenticity of host communities and ensuring viable long-term economic activities. In the specific context of geoparks, sustainable tourism takes on a particular dimension: it is not only about minimizing negative impacts, but also about using geological heritage as an engine for local development, environmental education, and territorial cohesion.

Geotourism is defined as "a form of sustainable tourism that combines the appreciation of geological heritage with educational, cultural, and recreational experiences". UNESCO geoparks have proven to be ideal laboratories for the development of this type of tourism, integrating conservation, science, culture, and education as strategic pillars of their management model. International experience shows that tourism in geoparks can generate significant positive impacts when based on the following principles:

- **Community participation:** local communities are not merely passive recipients of tourism, but active agents in the planning, management, and distribution of benefits. In the case of Guamuhaya, the director of the Topes de Collantes tourist complex himself has acknowledged that there are significant challenges regarding community participation and the sustainability of the implementation process.
- **Education and heritage interpretation:** the tourism experience in geoparks transcends mere aesthetic enjoyment to become an opportunity for meaningful learning about the geological history of the planet and its relationship to human life.
- **Diversification of offerings:** beyond geosites, geoparks integrate cultural routes, local gastronomy, crafts, and other expressions of intangible heritage, enriching the visitor experience and expanding economic benefits.
- **Carrying capacity and monitoring:** managing visitor flow is essential to prevent the degradation of geosites and ensure a quality experience.

1.1.3. The Nature-Health Link: scientific evidence and theoretical models

The third pillar of this theoretical framework is the growing scientific evidence on the benefits that contact with nature provides for human health, in its physical, mental, and social dimensions. This relationship, although intuitively recognized since ancient times, has only been the subject of systematic research in recent decades, generating a solid body of knowledge that supports the inclusion of health as a relevant variable in the management of protected natural areas.

1.1.4. Mental and Emotional Health Benefits

Numerous studies have documented that contact with natural environments produces measurable positive psychological effects. Among the identified mechanisms are:

- **Stress reduction:** exposure to natural spaces significantly decreases cortisol levels "the stress hormone" and reduces activation of the sympathetic nervous system. This effect has been observed in both wild environments and urban parks.
- **Restoration of attention:** the Attention Restoration Theory (ART), proposed by Kaplan and Kaplan (1989) [32], posits that natural environments allow for recovery from mental fatigue caused by sustained focused attention, characteristic of contemporary urban life. This mechanism is particularly relevant for designing tourism experiences in geoparks focused on disconnection and psychological well-being.
- **Improved mood and reduced depressive symptoms:** Recent research show that nature tourism programs can significantly reduce clinical symptoms of anxiety and depression. Sunlight, in turn, triggers the release of serotonin and vitamin D, which are associated with improved mood and concentration.

A systematic review identified five dimensions of psychological benefits associated with contact with nature: (a) restoration of attention, (b) stress reduction, (c) subjective well-being, (d) emotional regulation, and (e) social connection.

1.1.5. Benefits for Physical Health

The positive effects of nature on physical health have been widely documented by international organizations such as the World Health Organization (WHO). Evidence indicates that frequent access to green spaces is associated with:

- Reduction in cardiovascular morbidity and mortality.
- Decreased obesity and the risk of developing type 2 diabetes.
- Improved immune function.
- Reduction in blood pressure.

In the specific context of geoparks, the physical activities they promote hiking, cycling, caving, canyoning constitute forms of moderate exercise that contribute to cardiovascular health, weight management, and improved overall fitness. The WHO recommends a minimum of 150 minutes of moderate-intensity physical activity per week, a threshold that can be easily reached through the active tourism activities offered by these areas.

1.1.6. Geoparks, health and well-being: an emerging field

Specific research on the relationship between geoparks and health constitutes an emerging but promising field of study. A study conducted in the Villuerca-Ibores-Jara Geopark (Spain) analyzed whether geoparks contribute to improving the health of tourists over 65 years of age, finding that a significant proportion of visitors came to the geopark for psychotherapeutic reasons, particularly valuing its high environmental and geological interest as a factor in well-being. This finding suggests that geoparks possess a still largely unexplored potential as therapeutic spaces and spaces for promoting health.

Likewise, the transition from conventional protected area models to UNESCO geoparks reflects a paradigm shift toward more integrative approaches, where tourism is conceived not only as an economic activity but also as a vehicle for promoting health and well-being. This approach is fully consistent with the holistic conception of health promoted by the WHO, which defines it as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".

2. Proposed Theoretical Framework: towards an integrative model

Based on the literature review, an integrative theoretical framework is proposed that articulates the three dimensions analyzed. This framework is based on the following theoretical constructs and establishes the conceptual relationships that link them.

2.1. Fundamental Theoretical Constructs

Construct 1: Geological Heritage (Geodiversity and Geoconservation)

Conceptual Definition: a set of geological elements (formations, structures, minerals, fossils, soils, and landscapes) that possess scientific, educational, cultural, and/or aesthetic value, and that require protection and management for present and future generations.

Theoretical Foundation: it is based on geoconservation as a scientific discipline [6,11,15] and on the principles of UNESCO's International Strategy for Geoconservation. In the Cuban context, it is framed within Decree 11/2020 [31], "On the Geological Heritage of Cuba."

Construct 2: sustainable tourism in geoparks

Conceptual Definition: a tourism development model centered on geotourism that optimizes the use of geo-heritage resources, minimizes negative environmental and socio-cultural impacts, and maximizes economic benefits for local communities, ensuring the long-term viability of the destination.

Theoretical Framework: it is based on the UNWTO definition of sustainable tourism and the three pillars of UNESCO geoparks: geoconservation, geoeducation, and geotourism.

Construct 3: holistic health

Conceptual Definition: a state of complete physical, mental, and social well-being not merely the absence of disease that can be promoted through meaningful experiences with nature and geological heritage.

Theoretical Foundation: this construct is based on the WHO definition of health (1948), the Attention Restoration Theory [32], the Stress Reduction Theory (Ulrich, 1983) [33], and the Biophilia Hypothesis (Wilson, 1984) [34], as well as the growing body of evidence on the benefits of green and blue spaces for physical and mental health.

Construct 4: Local Community (Social Capital and Participatory Governance)

Conceptual Definition: The set of social actors who inhabit the geopark territory, whose well-being, active participation, and empowerment are necessary conditions for the sustainability of the tourism model and equity in the distribution of benefits.

Theoretical foundation: It is based on the approaches of participatory territorial governance, community social capital and endogenous development, in line with the guidelines of UNESCO geoparks that prioritize community participation as a cross-cutting axis of their management.

2.2. Relationships between constructs

The proposed theoretical model postulates the following relationships between the defined constructs:

1. Geological Heritage constitutes the foundational resource upon which sustainable tourism in the geopark is based. Without geodiversity, geotourism is impossible, and without geoconservation, this heritage is irreversibly degraded.
2. Sustainable Tourism acts as a fundamental mediating variable, transforming geological heritage into an educational tourism experience and a source of socioeconomic benefits. When tourism is managed according to sustainability principles, it generates positive impacts on the health of visitors (through physical activity, stress reduction, and connection with nature) and on the quality of life of local communities (through employment, income, and strengthening of cultural identity).
3. Holistic Health is configured as a dependent variable and, simultaneously, as a criterion for evaluating the model's success. The contact with nature fostered by the geopark, mediated by activities such as interpretive hiking, landscape appreciation, and environmental education produces documented benefits for the physical and mental health of visitors. At the same time, the improvement of the local community's socioeconomic conditions positively impacts its social determinants of

health.

4. The local community plays a dual role: it is a direct beneficiary of the model (through the generation of employment and income derived from geotourism) and a co-responsible agent for its sustainable management. Effective community participation strengthens the links between the other components and is a prerequisite for the sustainability of the system as a whole.

2.3. Graphic conceptual model

The following is an integrated conceptual model of the Guamuhaya Geopark for sustainable tourism and holistic health:

- **Territorial Context** (Cuban legal framework: Decree Law 331/2015; Decree 11/2020; Strategic axes of the National Program for Sustainable Economic Development (PNDES) 2030; Sustainable Tourism Policy and the National Geoparks Strategy).
- **Guamuhaya Geopark** (Geological Heritage) – (Geodiversity and Conservation) and Local Community (Social capital and participatory governance).
- **Sustainable Tourism** (Geotourism, environmental education, heritage interpretation, and community participation).
- **Physical Health** (Physical activity, reduction of risk factors) and Mental and Emotional Health (Stress reduction and restoration of focus).

*INTEGRAL HEALTH AND QUALITY OF LIFE (Visitors + Local Community)

Source: Prepared by the author.

2.4. Theoretical hypotheses derived from the model

The following theoretical hypotheses are derived from the presented conceptual model and can be tested in future empirical research:

- **H1:** The quality of geodiversity and the conservation status of the geological heritage of the Guamuhaya Geopark are positively associated with the quality of the sustainable tourism experience.
- **H2:** The active participation of the local community in tourism management positively moderates the relationship between tourism development and the sustainability of the geopark.
- **H3:** The sustainable tourism experience in the Guamuhaya Geopark produces significant positive effects on the self-reported physical health of visitors.
- **H4:** The sustainable tourism experience in the geopark significantly reduces perceived stress levels and improves indicators of visitors' psychological well-being.
- **H5:** The development of sustainable tourism in the geopark is associated with improvements in the social determinants of health of local communities (income, employment, social cohesion).

2.5. Proposed methodology for the study

A qualitative methodology was adopted for the construction of this theoretical framework, based on a systematic review of the scientific literature and document analysis. The methodological phases comprised:

Phase 1. Systematic Literature Review

A search was conducted in academic databases (Scopus, Web of Science, SciELO, Redalyc, Dialnet, Google Scholar), using search terms that combined the following: “geopark,” “geopark and sustainable tourism,” “geopark and health,” “geotourism and wellness,” “nature tourism and mental health,” “green spaces and health benefits,” among others. Inclusion criteria considered publications in Spanish, English, and Portuguese, with a preference for those published within the last ten years, prioritizing systematic reviews, meta-analyses, and empirical studies with robust designs.

Phase 2. Documentary Analysis of the Guamuhaya Geopark

Official documents were analyzed, including Agreement 10240/2025 [29] of the Council of Ministers of Cuba published in the Official Gazette, institutional reports from the Ministry of Energy and Mines, and press releases from official Cuban sources. This analysis allowed for the characterization of the geopark in terms of its area, geosites, heritage values, and regulatory framework.

Phase 3. Theoretical integration and model construction

Based on the collected evidence, the findings were integrated through a process of theoretical triangulation, articulating the perspectives of geosciences, sustainable tourism, and health sciences into a single, coherent conceptual framework.

Phase 4. Validation through Expert Judgment (proposal for a future phase)

It is recommended that the resulting theoretical framework be validated by an interdisciplinary panel of experts, using techniques such as the Delphi method or focus groups with specialists in geology, tourism, public health, and community development.

2.6. Final considerations and projections

The proposed theoretical framework aims to fill a significant conceptual gap in the geopark literature by offering a model that explicitly articulates the dimensions of geological heritage, sustainable tourism, and holistic health. Its main contribution lies in overcoming the disciplinary fragmentation that has characterized the study of geoparks, integrating constructs that have traditionally been addressed separately into a single theoretical framework.

The limitations of this study should be acknowledged. First, this is a purely theoretical and documentary investigation, lacking empirical validation. Second, the proposed model was specifically designed for the context of the Guamuhaya Geopark, so its transferability to other geoparks would require contextual adaptations. Third, the literature on the specific relationship between geoparks and health is still in its early stages, which limits the availability of robust evidence in this particular area.

The following are recommended as future lines of research: (a) operationalizing the model's constructs using validated measurement instruments (perceived health surveys, stress scales, tourism sustainability indicators); (b) conducting mixed-methods empirical studies (quantitative and qualitative) in the Guamuhaya Geopark to test the hypotheses derived from the model; (c) developing a health impact assessment tool specifically for geoparks; and (d) conducting comparative studies between Guamuhaya and other geoparks in Cuba and the Caribbean to identify common patterns and contextual specificities.

Ultimately, the theoretical framework proposed here is offered as a conceptual tool to guide decision-making in the management of the Guamuhaya Geopark, with the aspiration that this unique territory will become a benchmark for the successful integration of geoconservation, sustainable

tourism, and the promotion of health for all.

3. Conclusion

The Guamuhaya geopark has therapeutic potential with ample possibilities for exploitation, capable of positioning it as a benchmark for sustainable wellness tourism in the Caribbean.

3.1. Transparency

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study, and that any iscrepancies from the study as planned have been explained.

3.2. Competing Interests

All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

References

1. Leff E. The geopolitics of biodiversity and sustainable development: Economization of the world, environmental rationality, and social appropriation of nature. OSAL. 2005;17:263–273.
2. López R, Salazar J, Hurtado F. Geoparks and their support for endogenous development: A view from Venezuela. In: Carvalho C, Rodrigues J, Jacinto A, editors. Geotourism and Local Development. Idanha-a-Nova: Câmara Municipal de Idanha-a-Nova; 2008. p. 109–117.
3. Sánchez JL. Geoconservation and geoparks in the global context: A holistic vision for Latin America and the Caribbean. In: 2nd National Geotourism Congress. San Felipe, Yaracuy, Venezuela: Geoparks Foundation of Venezuela; 2011. Available from: http://dl.dropbox.com/u/3265939/PPT.IICNG/Dia%203/5.Sanchez.pdf
4. Toledo V. Rethinking conservation: Protected natural areas or bioregional strategy? Ecological Journal. 2005;77:67–83.
5. Farsani NT, Coelho C, Costa C. Geotourism and geoparks as novel strategies for socio-economic development in rural areas. Int J Tourism Res. 2010;13:68–81.
6. Brilha J, Gray M, Pereira DI, Pereira P. Geodiversity: An integrative review as a contribution to the sustainable management of the whole of nature. Environ Sci Policy. 2018;86:19–28.
7. Jumbo EE, Herrera FRJ, Ávila AA, Chicaiza OÁ, Morocho CM, Chicaiza OC. Assessment of biodiversity, threats and conservation status of the flora and fauna of the Puyango Petrified Forest. Green World J. 2021;4(2):12–18.
8. Arrage JA. Geotourism for UNESCO Global Geoparks: A toolkit for developing and managing tourism. Paris: UNESCO; 2024. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000391228
9. McKeever P, Zouros N. Geoparks: Celebrating Earth heritage, sustaining local communities. Episodes. 2005;28:274–278.
10. Carrión MP, Borja BC, Herrera FG, Morante CF, Jaya MM, Maldonado ZA, *et al*. Geosites and geotourism in the local development of communities of the Andes Mountains: A case study. Sustainability. 2021;13(9):4620–4624.
11. Azman N, Halim SA, Liu OP, Saidin S, Komoo I. Public education in heritage conservation for geopark community. Procedia Soc Behav Sci. 2010;7:504–511.
12. Yang G, Chen Z, Tian M, Wu F, Wray RAL, Ping Y. On the growth of national geoparks in China: Distribution, interpretation and regional comparison. Episodes. 2011;25(1):33–37.
13. Lincango BVF, Pazmiño VPM. Geotourism routes as a strategy for the recognition and conservation of geoheritage in the Puyango Petrified Forest Geopark Project. Siembra. 2025;12(1):e7664.
14. Hose TA. The English origins of geotourism (as a vehicle for geoconservation) and their relevance to current studies. Acta Geogr Slov. 2011;51(2):343–359.
15. Hose TA. Editorial: Geotourism and geoconservation. Geoheritage. 2012;4(1–2):1–5.
16. Martínez FMP. An invitation to geotourism: Reflections on geodiversity and geotourism potential in Argentine Patagonia. Bol Geogr. 2013;(35):61–78. Available from: https://revele.uncoma.edu.ar/index.php/geografi/article/view/62
17. Tavera EMA, Estrada SN, Errázuriz HC, Hermelin M. Georoutes or geological itineraries: A geotourism model in the Ruiz-Tolima glacial volcanic complex, Central Cordillera of Colombia. Cuad Geogr Rev Colomb Geogr. 2017;26(2):219–240.
18. Coutinho ACA, Urano DG, Mate AJ, Nascimento MAL. Tourism and geotourism: A conceptual problem. Rev Rosa dos Ventos. 2019;11(4):754–772.
19. United Nations Educational, Scientific and Cultural Organization (UNESCO). Proceedings of the International Meeting: Geoparks, Sustainable Tourism and Local Development. Paris: UNESCO; 2021. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000380262
20. Pilogallo A, Nolè G, Amato F, Saganeiti L, Bentivenga M, Palladino G, *et al*. Geotourism as a specialization in the territorial context of the Basilicata region (Southern Italy). Geoheritage. 2019;11(4):1435–1445.
21. Palacio PJL, Sánchez CJL, Schilling ME. Geological heritage and its conservation in Latin America: National situation and perspectives. Mexico City: UNAM, Institute of Geography; 2016. https://doi.org/10.14350/gsxxi.li.18
22. Carcavilla UL. A practical guide to understanding geological heritage. Teach Earth Sci. 2014;22(1):5–18.
23. Dóniz PJ, Quintero AC. Proposal for urban geotourism routes in Icod de Los Vinos (Tenerife, Canary Islands, Spain). Cuad Geogr. 2016;55(2):320–343. Available from: https://revistaseug.ugr.es/index.php/cuadgeo/article/view/3014
24. Meléndez HG, Moreira JC, Carcavilla UL. Geotourism: The transition from a resource to an attraction. Terr Plural. 2011;11(2):327–337.
25. Dóniz PJ, Becerra RR, Beltrán YE. Geomorphosites in the UNESCO Global Geopark of El Hierro (Canary Islands, Spain) to promote geotourism in volcanic areas. Nor Geogr J. 2021;80:165–186.
26. Drinia H, Voudouris P, Antonarakou A. Editorial of special issue "Geoheritage and geotourism resources: Education, recreation, sustainability". Geosciences. 2022;12(6):245–251.
27. Morante CF, Herrera NG, Jiménez ON, Carrión MP. Puyango Petrified Forest, Ecuador: A geological

heritage of the Cretaceous Albian–Middle and its relevance for sustainable geotourism development. Sustainability. 2020;12(16):6569–6579.
28. López JP, Medina W, Bellos LI, Martínez F. Geotourism in the Tafí Valley: Development of geo-routes as a contribution to geoscientific knowledge of society. Geol Correl Ser. 2022;38(2):29–46.
29. Republic of Cuba. Agreement 10240/2025 of the Council of Ministers. Official Gazette. 2025;(96):GOC-2025-582-O96.
30. Republic of Cuba. Decree-Law 331/2015 on zones with special regulations. Havana: Government of Cuba; 2015.
31. Republic of Cuba. Decree 11/2020 on geological heritage of Cuba. Havana: Government of Cuba; 2020.
32. Kaplan R, Kaplan S. The experience of nature: A psychological perspective. Cambridge: Cambridge University Press; 1989.
33. Ulrich RS. Aesthetic and affective response to natural environment. Hum Behav Environ. 1983;6:85–125.
34. Wilson EO. Biophilia. Cambridge (MA): Harvard University Press; 1984.

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