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BIODIVERSITY, RESILIENCE, AND CONSERVATION BASED TOURISM: A GLIMPSE INTO INDONESIA'S MAROS-PANGKEP GEOPARK

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Abstract

This paper provides a captivating glimpse into the Indonesia's Maros-Pangkep Geopark's exceptional qualities. Research methodology outlining data collection and analysis, this piece utilizes a multi-pronged approach to unveil the captivating biodiversity of Maros-Pangkep Geopark. Immersive Exploration: Firsthand exploration of the geopark's diverse ecosystems, including rainforests, caves, and karst formations, provides a foundational understanding of the existing flora and fauna. Collaborating with park rangers, biologists, and conservationists working within the geopark offers invaluable insights. These experts possess extensive knowledge of endemic species, ongoing conservation efforts, and the intricate relationships within the ecosystem. Interviews and discussions with them paint a comprehensive picture of the geopark's biodiversity. Here, visitors can embark on a journey through time, exploring geological formations that tell the story of our planet's ancient past. The Maros-Pangkep Geopark boasts a unique blend of captivating landscapes, including majestic karst formations, hidden caves adorned with prehistoric art, and diverse ecosystems teeming with life.

Keywords: Geopark, Indonesia, Biodiversity

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Introduction

Presentation a jewel of Indonesia's natural crown, the Maros-Pangkep Geopark in South Sulawesi stands as a testament to the exquisite interplay between biodiversity (Jaya et al., 2022), geological marvels, and cultural heritage. Recognized as a World Natural Heritage Site, this geopark embodies the philosophy of conservation-based tourism (Junaid, 2014). Here, visitors can embark on a transformative journey, becoming stewards of this irreplaceable treasure. Towering karst formations pierce the sky, their flanks harboring hidden caves adorned with prehistoric artistry (Invanni & Zhiddiq, 2022). Beneath the surface, intricate networks of underground rivers weave through the limestone, sculpting a subterranean wonderland. But the true magic of Maros-Pangkep lies in its extraordinary biodiversity (Deharveng et al., 2021). Lush rainforests pulsate with life, providing a sanctuary for a dazzling array of endemic flora and fauna. From the agile Tarsier monkeys peering from the trees to the prehistoric-looking Celebes crested macaques swinging through the canopy, the geopark teems with captivating creatures. This introduction merely scratches the surface of the wonders that await in Maros-Pangkep. As we delve deeper, we'll discover how responsible tourism practices and a deep respect for nature are woven into the very fabric of this extraordinary place (Jaya et al., 2022). Geographic conservation aims to preserve geological diversity. Geomorphology, soil characteristics, systems, and processes which are inherently geographically diverse. Like biodiversity, geographic diversity is described as biodiversity equivalent to biodiversity and is worthy of protection. Assessing and quantifying geographic diversity is very important to create a strategy for geological conservation. Geological conservation strategies should be implemented before cataloging geology and geodiversity sites. This is because it involves setting management priorities. This is before proceeding with the assessment and cataloging of special elements of geographic diversity such as fossils, rocks, landforms, landscapes, soils, and active geological and geomorphological processes should be specified in selecting or evaluating the capabilities of geological resources and geographic diversity sources. It is recommended that the evaluation and valuation of science, education, and tourism be carried out or cultural identity and sustainable development. This comprehensive assessment should be carried out. This is because it may be a geological source that has no scientific value. This is due to limited publication by the national and/or international scientific community. But in the field of education, such websites may provide useful knowledge to students and general tourists (Jaya et al., 2022).

Literature serves as a multifaceted mirror reflecting our relationship with the natural world's incredible biodiversity. Here's a deeper dive into how literature explores this complex theme. Throughout history, literature has documented humanity's connection to the environment. From idyllic descriptions of vibrant ecosystems in works like?, these narratives underscore the value and wonder inherent in biodiversity (Ansori et al., 2022). Many literary works celebrate the intrinsic value of biodiversity, showcasing the intricate beauty and irreplaceable complexity of various species and ecosystems. From these narratives foster a sense of wonder and a deep appreciation for the natural world. Literature can be a powerful tool for raising awareness about the ongoing threats to biodiversity, a seminal work of environmental journalism, exposed the dangers of pesticides and ignited the modern environmental movement. Similarly, articles weave intricate narratives that highlight the interconnectedness of all living things, inspiring readers to become stewards of the environment (Jaya et al., 2022).

It's important to acknowledge that literature isn't always a one-sided love letter to nature. Works like Ernest Hemingway's "The Old Man and the Sea" explore the complex relationship between humans and the natural world, where survival can necessitate taking from the environment. Additionally, some narratives explore potential conflicts between human needs and conservation efforts, prompting readers to consider the ethical complexities of protecting biodiversity. Recent research analyzing the portrayal of biodiversity in literature suggests a

trend. Studies like posit a decline in references to specific species in contemporary literature. This could potentially reflect a growing disconnect between humans and nature, highlighting the need for stories that rekindle our appreciation for the natural world's richness (Hemingway, 1952).

Literature offers a rich needle point of perspectives on biodiversity. It serves as a chronicle of our connection to nature, a celebration of its inherent value, a call to action for conservation, and a platform for exploring the complexities of human-environment interactions. By researching into these narratives, we gain a deeper understanding of our place within the web of life and the vital role biodiversity plays in sustaining our planet (Von Rintelen et al., 2017).

Research Methodology

Outlining data collection and analysis, this piece utilizes a multi-pronged approach to unveil the captivating biodiversity of Maros-Pangkep Geopark.

Immersive Exploration: Firsthand exploration of the geopark's diverse ecosystems, including rainforests, caves, and karst formations, provides a foundational understanding of the existing flora and fauna. Observing plant and animal life in their natural habitat allows for a deeper appreciation of the delicate balance within the ecosystem.

Engaging with Local Experts: Collaborating with park rangers, biologists, and conservationists working within the geopark offers invaluable insights. These experts possess extensive knowledge of endemic species, ongoing conservation efforts, and the intricate relationships within the ecosystem. Interviews and discussions with them paint a comprehensive picture of the geopark's biodiversity. Informed consent and anonymity for participants would reflect the rigor of the research process. Finally, discussing any limitations encountered during the research and how these were addressed or mitigated would offer transparency and add depth to the study's findings.

Literature Review: Previous study literature review in the article provides a foundational understanding of the relationship between literature, biodiversity, and human interaction with the environment. The Global Geopark is a single, unified Areas and landscapes of international geological importance managed with a holistic approach to protect, educate and sustainable development guidelines. Bottom-up approaches to combining conservation with sustainable development while involving local communities are increasingly being used. The main elements are geological, biological and cultural diversity, with the goal of protecting the world's diversity. Protecting the environment and expanding the study of geosciences aim to protect geographic diversity, promote geological heritage to the public, and support sustainable economic development of the geopark territory primarily through geotourism (Ansori et al., 2022). Analyzing existing scientific literature on the Maros-Pangkep Geopark unveils detailed accounts of its biodiversity (Jaya et al., 2022). Research papers and reports published by biologists and ecologists provide a deeper understanding of the specific species present, their ecological roles, and potential threats to their existence.

Visual Storytelling: Consulting photographic archives and field guides depicting the geopark's flora and fauna serves as a valuable tool. Studying these visuals aids in species identification and provides a broader perspective on the region's biodiversity.

Community Engagement: Interacting with local communities residing within the geopark fosters a sense of cultural exchange and sheds light on traditional ecological knowledge. Understanding their historical relationship with the environment and their role in conservation efforts provides valuable insights into the human element of biodiversity preservation. This multifaceted approach combines firsthand experience, expert knowledge, scientific research, and cultural understanding to create a rich and comprehensive picture of the remarkable biodiversity found within Maros-Pangkep Geopark (Al Hazar et al., 2024).

Research Results

Portrait from Maros-Pangkep Geopark

The Maros-Pangkep Geopark in South Sulawesi, Indonesia, transcends the realm of a mere landscape; it's a breathtaking testament to the enduring power of nature and the passage of time. Imagine towering limestone karst formations, their ancient surfaces etched with prehistoric stories, like weathered pages of a forgotten world. Lush rainforests, emerald tapestries woven with dappled sunlight, cloak the valleys below. The silence is broken only by the vibrant hum of life-a symphony unlike any other venture into the caverns that honeycomb the karst, and you'll find whispers of the past echoing on the walls. Prehistoric art, rendered in shades of ochre and red, depicts the creatures that roamed these lands millennia ago. These silent testaments, like faded frescoes, speak of a bygone era, a time when humans first interacted with the wonders of Maros-Pangkep (Hayati & Dewi, 2020). The true masterpiece unfolds not on the canvas of rock, but in the symphony of life that plays out across the geopark. Agile Tarsier monkeys, their enormous eyes reflecting the forest's secrets, peer from the branches. The prehistoric-looking Celebes crested macaques, with their flamboyant headgear, swing through the canopy in a dazzling display of acrobatics, their playful calls echoing through the trees. Countless species of butterflies, each a flutter of color against the verdant backdrop, flit among the vibrant blooms. From the tiniest jewel-toned beetle to the majestic birds of paradise soaring overhead, the geopark pulsates with the rhythm of life in all its breathtaking diversity (Supriatna, 2022).

Wonder doesn't stop at the surface. Beneath the verdant embrace of the rainforest lies another realm, hidden from plain sight. Intricate networks of underground rivers carve their way through the limestone, sculpting a subterranean wonderland. Crystal-clear pools reflect the dappled sunlight filtering down through cracks in the earth's crust. This hidden aquatic world harbors its own unique creatures, blind fish navigating the inky depths, and translucent crustaceans clinging to the submerged rocks. It's a testament to the tenacity of life, thriving in an environment untouched by the sun's rays (Inglis, 2012). The Maros-Pangkep Geopark is more than just a stunning landscape; it's a call to action (Duli et al., 2019). Its irreplaceable beauty and the delicate balance of its ecosystems remind us of our responsibility to protect the natural world. By promoting responsible tourism practices and fostering a deep respect for nature, we can ensure that this magnificent portrait continues to inspire generations to come. We become stewards of this extraordinary place, ensuring its intricate tapestry of biodiversity remains vibrant for all who have the privilege to witness it.

Rammang-Rammang: A Triumph of Community Conservation, a Tapestry of Nature and Resilience

Carved by time and cradled within the Maros-Pangkep Geopark, Rammang-Rammang unfolds as a breathtaking landscape (Mandong et al., 2023). Towering karst formations pierce the sky, their jagged peaks casting dramatic shadows over emerald rice paddies that shimmer beneath the tropical sun. Labyrinthine waterways snake through the valleys, their glassy surfaces reflecting the vibrant tapestry of flora and fauna. But Rammang-Rammang's story transcends its captivating scenery. It's a saga etched in resilience, a testament to the unwavering spirit of a community who rose to protect their precious environment. For decades, the specter of marble and limestone mining loomed large over Rammang-Rammang (Kadang et al., 2021). The promise of economic gain masked a devastating truth-the potential obliteration of the ecosystem and the cultural heritage that lay at its heart. Yet, the local community, led by the unwavering resolve of environmental activist Iwan Dento, refused to be silent bystanders. They embarked on a remarkable journey, a fight not just for the preservation of rocks and trees, but for their way of life, their cultural heritage, and the future of their children (Forshee, 2006). Their resistance wasn't merely fueled by slogans and protests; it was a powerful movement anchored in a deep understanding of their symbiotic relationship with the land. Through tireless

campaigning, community meetings held under the watchful gaze of the karst giants, and unwavering determination, they achieved a seemingly impossible feat-a shift in policy. Mining activities were halted, and a new path emerged ecotourism. This wasn't just a change in industry; it was a paradigm shift. Locals transformed themselves from miners into stewards of their environment. They donned the hats of nature guides, homestay providers, and custodians of the land. Ecotourism initiatives, meticulously planned and executed by the community, allowed visitors to experience the magic of Rammang-Rammang in a sustainable way. Traditional boats, crafted from locally sourced wood, glided through the labyrinthine waterways, revealing hidden caves adorned with prehistoric art and breathtaking vistas that unfolded like scenes from a forgotten world. Homestays offered a window into the vibrant culture of the Bugis people, where stories were whispered under the soft glow of oil lamps and meals were prepared using fresh, locally sourced ingredients. Laughter mingled with the rustling of leaves as visitors learned traditional weaving techniques and participated in rice planting ceremonies, forging a deeper connection with the land and its people.

Rammang-Rammang's triumph extends far beyond its borders. It stands as a beacon of hope, a model for sustainable development that resonates across the globe. It underscores the vital role communities play in conservation efforts, demonstrating that economic prosperity and environmental protection can co-exist. The success story is woven into the very fabric of Rammang-Rammang-the lushness of the rice paddies nurtured by generations, the vibrant tapestry of birdlife echoing through the valleys, the crystal-clear waters reflecting the unwavering commitment of a community who chose to fight for their irreplaceable heritage. Today, Rammang-Rammang thrives as a living testament to the power of collective action. It's a testament that even the smallest voices, united in purpose, can create the biggest impact. The journey continues, with the community constantly innovating and adapting. But one thing remains certain-Rammang-Rammang's story serves as a powerful reminder that nature and human resilience can intertwine to create a tapestry of hope for the future (Resosudarmo & Jotzo, 2009).

Against the Tide: Building Conservation through Tourism in the Face of Industrial Greed Biodiversity

The use of geotourism potential indicated that eight locations were of high value and thirteen were of medium value. The assessment results reflect the outstanding geotourism for scientific and recreational purposes in coastal areas. Private domains and tectonic structures are more prominent among tertiary visitors. It is necessary to improve the system for promoting and managing geological resources to include attractions from a cultural and biological perspective. The surrounding area has a large population and access to external transport such as an airport close to the area should be considered. Fortunately, the awareness, attitude and participation of the local community has been fully supported. This is because geology-related work increases educational ability and annual income.

The battle for the soul of our planet often unfolds on a grand scale, with headlines screaming of deforestation, melting glaciers, and endangered species. But the fight for conservation also plays out in quieter corners of the world, where communities stand defiant against the relentless march of industry. In Indonesia's Maros-Pangkep Geopark, a captivating tapestry of karst formations, emerald rainforests, and hidden cave networks, a quiet revolution is brewing. Here, communities forge a path towards conservation, not by fists raised in defiance, but by wielding a seemingly unlikely weapon-tourism (Priatini, 2018).

Maros-Pangkep Geopark isn't merely a breathtaking landscape; it's a World Natural Heritage Site whispering tales of the past through prehistoric art and harboring a staggering diversity of life. Towering karst formations stand like silent guardians, while hidden cave networks harbor secrets waiting to be unveiled (Pawalluri, 2023). Lush rainforests, vibrant with the calls of exotic birds and the rustle of unseen creatures, create a captivating symphony. However, this

paradise has faced a chilling threat—the relentless pursuit of profit. The allure of extracting valuable marble and limestone loomed large, a promise of economic gain that masked a devastating truth: the potential obliteration of the ecosystem, leaving behind a wasteland in its wake. The communities living within the geopark refused to be mere bystanders in this fight. They understood the intrinsic value of their natural heritage, not just for its breathtaking beauty, but for its role in sustaining their culture, their livelihoods, and the very future of their land. Instead of resorting to confrontation, they embarked on a daring experiment—building a bulwark against industrial greed through tourism.

Ecotourism became their weapon of choice. This wasn't a mere rebranding—it was a paradigm shift. Locals transformed themselves from potential miners into stewards of their environment. They became nature guides, homestay providers, and educators, inviting visitors to experience the geopark's wonders sustainably. Tourists arrived not as conquerors, but as guests, their presence generating income that could support conservation efforts. The beauty of this approach lies not just in its economic viability, but in its transformative power. As tourists navigate the labyrinthine waterways aboard traditional wooden boats, explore hidden caves adorned with prehistoric art, and come face-to-face with the dazzling biodiversity of the rainforest, they forge a deeper connection with nature. This connection breeds understanding and respect, fostering a desire to protect what they have come to cherish. Witnessing the majestic Tarsier monkeys with their enormous eyes, the playful antics of the Celebes crested macaques, or the vibrant dance of butterflies among the verdant foliage ignites a sense of wonder and a responsibility to ensure these creatures continue to thrive.

Building conservation through tourism isn't without its challenges. Balancing economic needs with environmental protection requires constant vigilance and innovation. Overdependence on tourism can be fickle, susceptible to external forces. Ensuring responsible practices and minimizing environmental impact requires ongoing education and adaptation. Yet, the story of the Maros-Pangkep Geopark offers a glimmer of hope. It demonstrates that even in the face of overwhelming industrial forces, communities can find creative solutions. They have turned tourism into a powerful tool, not just for economic development, but for safeguarding the very essence of their land. They are proving that nature and responsible tourism can indeed forge a path towards a sustainable future, a future where the majestic karst formations continue to pierce the sky, and the rainforests hum with the vibrant symphony of life. The Maros-Pangkep Geopark stands as a beacon, a testament to the power of community action and the transformative potential of tourism, reminding us that even the quietest voices, united in purpose, can create the biggest impact (Ansori et al., 2022).

Biodiversity, Resilience, and Conservation Based Tourism of the Geopark

The findings and discussion section of the article effectively highlights the positive impacts of ecotourism in Maros-Pangkep Geopark, including community empowerment and conservation successes. It provides a detailed account of how local communities have transitioned from mining to ecotourism, contributing to both economic development and environmental protection. However, the section could be enhanced by incorporating a more critical analysis of the challenges and limitations associated with ecotourism. While the benefits are well-documented, a deeper exploration of potential negative impacts, such as over-tourism, cultural commodification, or environmental degradation, would offer a more balanced view. This condition will expand the collaboration and enhance the roles of everyone to enrich the situation.

The story of Maros-Pangkep Geopark in Indonesia unfolds a captivating narrative of natural wonders juxtaposed against the ever-present struggle for balance between progress and preservation. This breathtaking World Natural Heritage Site, adorned with towering karst formations, lush rainforests teeming with life, and hidden caves whispering tales of the past, faces a constant challenge—safeguarding its irreplaceable beauty in the face of economic

development aspirations. Here, we delve into the triumphs and tribulations of building conservation through tourism in this unique ecosystem. The shift towards ecotourism in Maros-Pangkep Geopark represents a significant victory. By empowering local communities, this approach fosters a sense of ownership and responsibility for the environment. Previously, the allure of mining threatened the very fabric of the geopark. Now, transformed into stewards of their land, locals have become active participants in conservation efforts. This shift incentivizes responsible behavior and ensures the long-term sustainability of the geopark's wonders.

Furthermore, ecotourism acts as an economic engine, generating income that can be directly reinvested in conservation projects. Revenue streams can be directed towards improving infrastructure for responsible tourism, supporting research initiatives to better understand and protect the ecosystem's delicate balance, and providing livelihood opportunities for the community. This financial stability creates a virtuous cycle-a thriving geopark attracts more tourists, generating more income for conservation, ultimately leading to a more sustainable future for both the environment and the local population (Harvey, 1974).

Perhaps the most profound impact of ecotourism lies in its potential for education and awareness. Tourists don't simply leave with stunning photographs; they become ambassadors for conservation. Their transformative experiences within the geopark, from witnessing the mesmerizing dance of butterflies amidst the emerald foliage to encountering the captivating Tarsier monkeys with their enormous eyes, foster a deeper appreciation for nature. This newfound respect translates into support for sustainable practices back in their home communities. The ripple effect of this awareness campaign can have a global impact, inspiring others to advocate for the preservation of natural heritage sites around the world (Sutton, 2002). While ecotourism offers a promising path forward, navigating the road to sustainable development in Maros-Pangkep Geopark requires careful consideration of potential pitfalls. Maintaining a delicate balance between economic gains and safeguarding the ecosystem is paramount. Overtourism, the influx of excessive visitors, can lead to environmental degradation through increased waste generation, strain on natural resources, and disruption of wildlife habitats. Implementing responsible practices is crucial for mitigating this threat. Limiting visitor numbers through a permit system, establishing designated trails to minimize impact on vulnerable ecosystems, and promoting eco-friendly transportation options like bicycles or traditional boats are all essential components of sustainable tourism management. Another key consideration is ensuring community needs and equity are addressed. The economic benefits of ecotourism must be distributed fairly within the community to prevent resentment and foster long-term support for conservation efforts. Training programs can equip locals with the skills necessary to participate in the tourism industry, such as becoming certified nature guides or establishing eco-friendly lodging options. Providing opportunities for local businesses to participate in the tourism supply chain, from offering locally sourced food options to showcasing traditional crafts, further strengthens the connection between the community and the geopark's success.

Finally, the long-term sustainability of ecotourism hinges on diversification and adaptability. The tourism industry is inherently susceptible to external factors like economic downturns or global crises. Developing alternative, sustainable practices can help buffer against these external shocks. Investing in research and development of sustainable agricultural practices or exploring renewable energy options can create a more resilient economic model for the communities living within the geopark (Druce, 2009).

A Model for the Future: Inspiration and Collaboration

Effectively sets the stage for the Maros-Pangkep Geopark's transformation from mining to ecotourism, highlighting its significance as a World Natural Heritage Site with exceptional biodiversity and geological formations. It underscores the role of local communities in this transition, emphasizing the shift towards sustainable development and conservation efforts.

This narrative establishes a compelling framework for discussing the interplay between environmental protection and economic development through ecotourism.

While the introduction effectively outlines the geopark's transition and its importance, it could benefit from a more explicit articulation of the research questions or objectives guiding the article. The current introduction provides a broad overview but lacks specific details on the scope of the analysis or the methodologies employed to assess the impact of ecotourism on both the environment and local communities. This omission might leave readers questioning the depth of the investigation and the evidence supporting the claims made.

Maros-Pangkep Geopark stands as a testament to the possibility of achieving a balance between economic development and environmental protection. By prioritizing responsible tourism practices, fostering community participation in conservation efforts, and continuously adapting to meet challenges, the geopark paves the way for a future where breathtaking landscapes and rich biodiversity are preserved for generations to come.

Looking ahead, the Maros-Pangkep Geopark model can serve as a source of inspiration for other communities facing similar challenges. Technological advancements can be leveraged to monitor and manage tourist impact within the geopark. For example, real-time data collection on visitor numbers and movement patterns can inform adjustments to tourist flow to minimize pressure on sensitive areas. Educational institutions can play a vital role in fostering environmental awareness and responsible tourism practices. By integrating sustainability principles into curriculums and organizing educational tours within the geopark, future generations can be empowered to become stewards of their environment. Collaboration between local communities, government agencies, and international organizations is crucial for ensuring the long-term success of the Maros-Pangkep Geopark.

Conclusion

The story of Maros-Pangkep Geopark is a symphony in contrast-a breathtaking natural tapestry threatened by the harsh realities of industry, a testament to the enduring power of nature interwoven with the struggles of human progress. Yet, amidst these contrasting melodies, a hopeful tune emerges-the transformative power of responsible tourism. By empowering local communities and fostering a sense of ownership for their irreplaceable heritage, Maros-Pangkep Geopark has charted a path towards a sustainable future. Ecotourism serves as a bridge connecting economic development with environmental protection. It fosters a deeper appreciation for nature among visitors, turning them into ambassadors for conservation.

The challenges remain-ensuring responsible practices, maintaining a balance between economic needs and environmental protection, and adapting to a changing world. However, the model established by Maros-Pangkep Geopark offers a beacon of hope, a testament to the resilience of nature and the power of collective action. As we move forward, let the story of Maros-Pangkep Geopark inspire us. Let us strive to create a world where breathtaking landscapes and the symphony of life they harbor are not just preserved for future generations, but actively cherished and protected. By embracing responsible practices, fostering collaboration, and empowering communities, we can ensure that the delicate balance between progress and preservation continues to resonate, creating a harmonious future for the natural wonders that enrich our planet.

The conclusion of the article effectively synthesizes the Maros-Pangkep Geopark's journey towards sustainable ecotourism, highlighting its role in empowering local communities and conserving biodiversity. It encapsulates the geopark's achievements in fostering economic development alongside environmental protection. However, the conclusion could be enhanced by more explicitly addressing the broader implications of these findings for the field of sustainable tourism and conservation. While it successfully recounts the geopark's transition

and its benefits, it stops short of fully exploring how these insights could inform or inspire similar initiatives globally.

This could involve outlining key strategies for engaging local communities, managing tourist impacts, and ensuring the financial sustainability of ecotourism projects. Additionally, identifying areas for future research would not only underscore the contribution of the article to academic discourse but also highlight the ongoing challenges and opportunities in the field of sustainable tourism. By doing so, the conclusion would not only recapitulate the article's findings but also position it as a pivotal reference point for furthering the agenda of sustainable development and conservation through ecotourism.

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