



SUSTAINABLE CONSERVATION OF THE SILOKEK GEOPARK AREA TO BECOME A LEAD TOURISM DESTINATION IN WEST SUMATERA, INDONESIA

Zilvina.B¹, Syamsul Bachri², Sumarmi³, Didik Taryana⁴

¹*Doktoral Student of Department of Geography, Faculty of Social Science,
STATE UNIVERSITY OF MALANG, INDONESIA*

^{2,3,4}*Faculty of Social Science, Geography Department,
STATE UNIVERSITY OF MALANG, INDONESIA*

¹*Faculty of Teacher Training and Education, Geography Department,
STATE ISLAMIC UNIVERSITY OF SULTAN SYARIF KASIM
RIAU, INDONESIA*

Abstract

Geoparks play an important role in integrating geological conservation with sustainable tourism development. However, many geopark studies remain largely descriptive and provide limited analytical insights into governance and spatial planning implications. This study examines sustainable conservation practices in the Silokek Geopark, West Sumatra, Indonesia, focusing on the interaction between geodiversity conservation, community participation, and institutional governance within a spatial planning context. A qualitative approach was employed through in-depth interviews, field observations, and document analysis. Data were analyzed using the sustainable geopark management framework proposed by Xu and Wu, which emphasizes environmental conservation, community participation, and governance structures. The findings show that conservation practices in the Silokek Geopark are supported by strong community involvement through local institutions. However, governance arrangements remain largely operational and have not been fully integrated into formal spatial planning frameworks. This situation limits the strategic role of conservation in guiding sustainable tourism development and regulating spatial use. This study contributes to the planning literature by demonstrating that effective geopark conservation requires not only environmental protection but also the integration of community-based conservation into spatial planning instruments and governance systems. The findings provide policy insights for strengthening sustainable geopark management in developing regions.

Keywords: Geopark, sustainable conservation, community participation, spatial planning, governance

² Corresponding author. Email: syamsul.bachri.fis@um.ac.id

INTRODUCTION

Indonesia possesses remarkable geological diversity, providing a strong foundation for geopark development that integrates geo-conservation, geo-education, and sustainable tourism (Ansori et al., 2022; Bhinekawati et al., 2020; Mallinis et al., 2023; Mucivuna et al., 2022; Reinhart et al., 2023). Geoparks are increasingly recognised as planning instruments that balance environmental conservation with regional economic development by protecting geological heritage while promoting community-based tourism. Within this context, sustainable geopark management requires not only the conservation of geological resources but also effective governance, stakeholder collaboration, and spatial planning to ensure that tourism development does not exceed environmental carrying capacity (Crofts, 2019; Gordon et al., 2021; Ríos et al., 2020).

One of Indonesia's geoparks with significant geological potential is the Silokek Geopark (SG) in Sijunjung Regency, West Sumatra. The geopark contains karst landscapes, caves, waterfalls, rivers, and diverse geological formations that support geotourism development (Febrianto et al., 2022; Bhinekawati et al., 2020). Nevertheless, the area faces substantial environmental challenges. Illegal gold mining within production and protected forest areas has accelerated land degradation, increased river sedimentation, and threatened ecological sustainability (Sijunjung Regency Government, 2019). These environmental pressures may reduce both the conservation value of geosites and the long-term attractiveness of the geopark as a tourism destination.

Sustainable geopark management depends on collaborative governance involving governments, local communities, customary institutions, and tourism stakeholders (Irwandi et al., 2024; Ari Sulistyio et al., 2023). In the Silokek Geopark, collaboration is implemented through the Geopark Management Agency, Forest Village Community Institutions (LMDH), Tourism Awareness Groups (Pokdarwis), and local communities. Their respective roles include environmental conservation, tourism management, visitor services, and community-based enterprises, contributing to local economic development while strengthening conservation efforts (Sumarmi & Untari, 2022; Hazar et al., 2024).

Although previous studies have examined geodiversity, geotourism, and community participation in geoparks, limited attention has been given to how sustainable conservation is implemented through the integration of environmental conservation, community participation, governance, and spatial planning within a single geopark management system. Furthermore, few studies have analysed how local conservation practices are supported by planning instruments and institutional arrangements to maintain environmental sustainability while promoting tourism development. This gap is particularly evident in Indonesian geoparks, where conservation and tourism frequently develop at different rates.

Therefore, this study aims to analyse sustainable conservation practices in the Silokek Geopark using the Sustainable Geopark Management Framework proposed by Xu and Wu (2022). Specifically, the study examines how environmental conservation, community participation, and governance interact to support sustainable tourism development. The findings are expected to contribute to sustainable geopark planning by providing empirical evidence on the integration of conservation strategies, stakeholder collaboration, and spatial planning within an Indonesian geopark.

LITERATURE REVIEW

Sustainable Environmental Conservation and Management

Geoparks are recognized as a regional development approach that integrates geological conservation, environmental education, and sustainable tourism to promote local economic development. Within the planning perspective, geoparks function not only as areas of high geological value but also as spatial entities requiring integrated governance, stakeholder collaboration, and adaptive spatial planning to balance conservation objectives with regional development (Xu & Wu, 2022; Gordon et al., 2021; Mucivuna et al., 2022; Reinhart et al., 2023). Consequently, sustainable environmental conservation extends beyond protecting geological resources to include participatory governance, spatial planning, and community involvement. Previous studies indicate that conservation initiatives are more effective when governments, local communities, and other stakeholders collaborate to maintain environmental quality while supporting sustainable regional development (Crofts, 2019; Gordon et al., 2021; Ríos et al., 2020).

Geological Diversity (Geodiversity)

Geodiversity refers to the diversity of geological features, including rocks, minerals, fossils, landforms, geomorphological processes, and geological structures that shape the Earth's landscapes (Mallinis et al., 2023; Mucivuna et al., 2022). Beyond its scientific significance, geodiversity provides the foundation for geopark development by supporting conservation, environmental education, and geotourism (Ansori et al., 2022; Bhinekawati et al., 2020). Within spatial planning, geodiversity also serves as a basis for conservation zoning, land-use planning, development control, and environmental risk mitigation. Integrating geodiversity into spatial planning is therefore essential to ensure that tourism development remains consistent with the environmental carrying capacity of geopark areas.

Geopark Management Bodies and Stakeholder Collaboration

Effective governance is a key determinant of sustainable geopark management because geoparks function simultaneously as conservation areas, educational sites, and tourism destinations (Reinhart et al., 2023). The Sustainable Geopark Management Framework proposed by Xu and Wu (2022) identifies governance, environmental conservation, and community participation as three interrelated dimensions supporting sustainable geopark management. Governance emphasizes institutional coordination, stakeholder collaboration, and policy implementation to ensure that conservation and tourism development are managed in an integrated manner. Previous studies indicate that well-structured geopark management institutions strengthen institutional capacity, facilitate stakeholder collaboration, and support sustainable management practices by coordinating governments, local communities, customary institutions, tourism organizations, and other stakeholders (Irwandi et al., 2024).

In the Silokek Geopark (SG), the establishment of the Geopark Management Agency in 2023 marked an important step toward strengthening institutional governance. The agency is responsible for planning, coordinating, implementing, and monitoring geopark development and conservation programs. Through collaboration with the Sijunjung Regency Government, Forest Village Community Institutions (LMDH), Tourism Awareness Groups (*Pokdarwis*), customary institutions, and local communities, the management body supports community participation while promoting environmental conservation and sustainable tourism development. This collaborative approach strengthens institutional coordination and contributes to the long-term sustainability of the Silokek Geopark (Sumarmi et al., 2022; Xu & Wu, 2022).

Based on the preceding literature, this study adopts the Sustainable Geopark Management Framework proposed by Xu and Wu (2022) as the analytical lens for examining sustainable conservation practices in the Silokek Geopark. The framework integrates three interrelated dimensions-environmental conservation, community participation, and governance-which provide the basis for analysing empirical findings presented in the subsequent sections.

METHODOLOGY

This study employed a qualitative case study to examine sustainable conservation practices in the Silokek Geopark (SG), Sijunjung Regency, West Sumatra, Indonesia. The study adopted the Sustainable Geopark Management Framework proposed by Xu and Wu (2022), which comprises three analytical dimensions: environmental conservation, community participation, and governance. These dimensions guided the research design, data collection, coding, and interpretation of the findings. The overall research framework is presented in Figure 2, while the analytical indicators are summarized in Table 2.

The research was conducted in the Silokek Geopark, Sijunjung Regency, West Sumatra, a national geopark characterized by significant geological, biological, and cultural diversity.

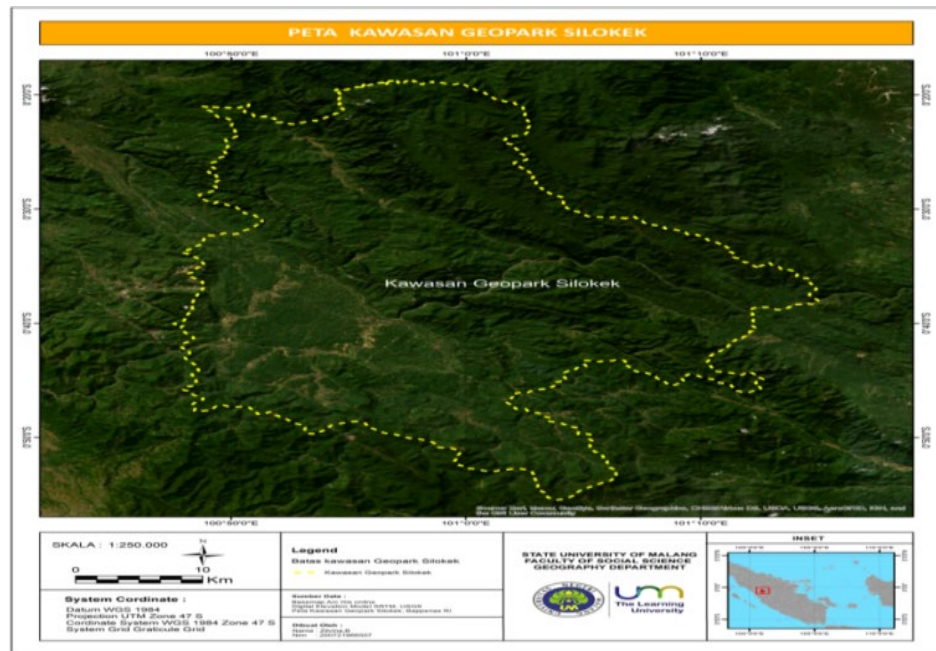


Figure 1. Map of the Silokek Geopark showing the study area in Sijunjung Regency, West Sumatra Province, Indonesia.
 (Source: Author, 2023)

Purposive sampling was used to select informants directly involved in the management and conservation of the Silokek Geopark. The selected participants included the Executive Chair of the Silokek Geopark Management Authority, tourism awareness groups (Pokdarwis), Nagari government representatives, and local community members involved in geopark management and tourism activities. This approach enabled the study to capture diverse perspectives on conservation practices and geotourism development. Details of the informants are presented in Table 1.

Table 1. List of Informants and Data Collection Methods

Informant	Role	Data Collection Methods
1	Geopark Management	In-depth Interview
2	Local Government	Interview and Observation
3	Tourism awareness Group Aia Angek	Interview and Observation
4	Tourism awareness GroupTimbulun	Interview and Observation
5	Tourism awareness GroupLubuk Tarok	Interview and Observation
6	Tourism awareness GroupBatu Manjulur	Interview and Observation
7	Tourism awareness Group Sumpur Kudus	Interview and Observation
8	Tourism awareness GroupKampung Adat Sijunjung	Interview and Observation

Primary data were collected between **August and December 2023** through semi-structured interviews, non-participant observations, and document analysis. Eight key informants were selected using purposive sampling based on their direct involvement and strategic roles in the management and conservation of the Silokek Geopark. The participants consisted of the Executive Chair of the Silokek Geopark Management Authority, one representative from the local government, and six representatives of Tourism Awareness Groups (Pokdarwis) from different geosites within the geopark.

Semi-structured interviews were conducted using an interview guide developed from the sustainable geopark management framework proposed by Xu and Wu (2022), which focuses on three analytical dimensions: environmental conservation, community participation, and governance. Each interview lasted approximately 30–90 minutes, was conducted face-to-face, and was audio-recorded with the participants' consent before being transcribed for analysis.

Non-participant observations were carried out during field visits to several geosites in the Silokek Geopark. The observations focused on the condition of geological heritage sites, tourism infrastructure, conservation practices, community participation, and environmental issues, including indications of illegal mining activities and river degradation. Observation data were used to verify and complement information obtained from interviews.

Document analysis was undertaken to strengthen the empirical findings. The documents reviewed included the Silokek Geopark Masterplan (2019), the Decree on the Establishment of the Silokek Geopark Management Authority, Nagari regulations concerning community-based conservation (Rimbo Larangan and Lubuk Larangan), tourism development reports, and relevant

planning and policy documents issued by the Sijunjung Regency Government. The combination of interviews, observations, and document analysis enabled methodological triangulation and enhanced the credibility of the research findings.

The collected data were analysed using Framework Analysis based on the Sustainable Geopark Management Framework proposed by Xu and Wu (2022). The analysis consisted of five stages: (1) familiarisation with interview transcripts, field notes, and documentary evidence; (2) development of an analytical framework based on environmental conservation, community participation, and governance; (3) coding and indexing qualitative data into thematic categories; (4) charting the coded data into analytical matrices; and (5) interpreting the findings by comparing empirical evidence with the analytical framework. The coding process followed the analytical dimensions presented in Table 2, while the overall research procedure is illustrated in Figure 2.

Data validity was ensured through source and method triangulation by comparing information obtained from interviews, observations, and documentary sources. In addition, cross-validation among informants was conducted to ensure data consistency and credibility. This approach was intended to enhance the reliability of the research findings and to strengthen the validity of the analytical interpretations.

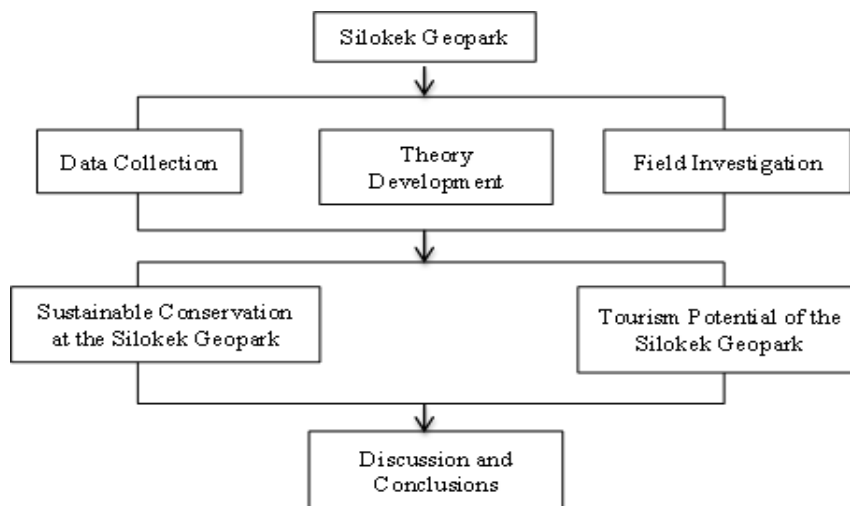


Figure 2: Research Framework and Framework Analysis Process
 (Adapted from Xu & Wu, 2022).

Table 2. Analytical Framework Applied in the Study

Analytical Dimension (Xu & Wu, 2022)	Indicators	Data Sources	Empirical Evidence
Environmental Conservation	Protection of geosites, forest conservation, river conservation, environmental sustainability	Interviews, field observations, document analysis	Community-based conservation practices, including <i>Rimbo Larangan</i> , <i>Lubuk Larangan</i> , and the <i>Pohon Asuh</i> program, contribute to protecting geological and ecological resources.
Community Participation	Community involvement in conservation, tourism management, and environmental awareness	Interviews, field observations	Local communities actively participate through Tourism Awareness Groups (Pokdarwis), environmental monitoring, and tourism-related economic activities.
Governance	Stakeholder collaboration, institutional coordination, policy implementation	Interviews, document analysis	The Silokek Geopark Management Agency, local government, and Nagari institutions collaborate in managing conservation and tourism, although coordination among stakeholders still requires improvement.
Spatial Planning Implications	Integration of conservation into spatial planning, land-use control, and tourism zoning	Document analysis, interviews	Conservation objectives have not yet been fully integrated into spatial planning instruments, indicating the need to strengthen zoning regulations, visitor management, and sustainable tourism planning.

Table 2 operationalizes the Sustainable Geopark Management Framework proposed by Xu and Wu (2022). The analytical dimensions guided the coding and interpretation of empirical findings obtained from interviews, observations, and document analysis.

RESULTS AND DISCUSSION

The Silokek Geopark (SG) in Sijunjung Regency, West Sumatra, possesses significant geological diversity that forms the foundation for conservation, education, and sustainable tourism development. The geopark contains karst landscapes, granite formations, river systems, and other geological features that provide important environmental, scientific, and tourism values.

A. Geological Diversity (Geodiversity) of the Silokek Geopark

The geological diversity of the Silokek Geopark is the result of long-term regional tectonic dynamics on the island of Sumatra, characterized by the interaction between the subduction of the Indo-Australian Plate and the Eurasian Plate. These geological characteristics are also recognized by local tourism managers. As stated by one informant:

“Silokek has unique karst cliffs, caves and granite formations which make it an important geological heritage area that needs protection.”
(Informant 3 – Pokdarwis Aia Angek).

Another informant also emphasized the importance of geological features along the Kuantan River:

“The geological formations along the Kuantan River attract visitors and researchers because they clearly expose rock structures and geomorphological processes.” (Informant 4 – Pokdarwis Timbulun)

These tectonic processes have produced metamorphic rocks, granite intrusions, karst landscapes, and river systems that provide significant scientific, educational, and tourism values while requiring integrated conservation and spatial planning.

From a regional planning perspective, the diverse and environmentally sensitive geological characteristics of the area necessitate adaptive spatial planning instruments that are grounded in environmental carrying capacity. However, field findings indicate that spatial planning and tourism development policies in the Silokek Geopark have not yet fully positioned geodiversity as a primary determinant in spatial decision-making. Geodiversity is more frequently treated as a tourism attraction rather than as a basis for regulating land use, zoning, and development intensity. As a result, conservation practices tend to operate at an operational level, lacking support from integrated long-term strategic planning.

The presence of the Kuantan Formation, granite intrusions, karst landscapes, and the Kuantan River demonstrates the high geological value of the geopark while also indicating its vulnerability to environmental degradation caused by land-use change and tourism pressure. These findings highlight the importance of integrating geodiversity into spatial planning and conservation policies.

Interviews with Informant 1 (Executive Chair of the Silokek Geopark Management Authority) indicate that although community-based conservation initiatives have been implemented through the Geopark Management Authority

and Tourism Awareness Groups (Pokdarwis), conservation objectives have not yet been fully integrated into statutory spatial planning. This situation reflects a governance gap between local conservation practices and formal planning systems, limiting the long-term sustainability of geodiversity conservation. Therefore, stronger integration of geodiversity into spatial planning instruments—including conservation zoning, land-use regulation, visitor carrying capacity management, and environmental protection—is essential to ensure that tourism development remains compatible with long-term conservation objectives.

B. Geotourism Potential of the Silokek Geopark

Karst morphology in the Silokek Geopark represents a major geotourism asset with significant scientific, educational, and economic value. The presence of caves, gorges, karst hills, and river landscapes forms a distinctive geological setting that supports sustainable geotourism development in Sijunjung Regency, West Sumatra. The spatial distribution of geosites across several *nagari* provides opportunities to diversify tourism destinations, reduce visitor concentration, and distribute economic benefits more equitably among local communities.

Field interviews indicate that improvements in accessibility have increased tourism activities within the geopark. As stated by one tourism manager:

“Since road access improved, tourist visits have increased. Visitors usually come for rafting, cave exploration and educational tourism activities.”
(Informant 5 – Pokdarwis Lubuk Tarok)

Another informant emphasized the contribution of tourism events to geopark promotion:

“Tourism events such as marathons and outdoor activities help introduce the Silokek Geopark to a wider audience and support the local economy.”
(Informant 6 – Pokdarwis Batu Manjukur)

The improvement of road networks and supporting tourism facilities has enhanced visitor accessibility, increased tourism activities, and strengthened the local tourism economy in the Silokek Geopark. These improvements have supported a variety of geotourism activities, including recreational tourism, educational tourism, rafting, cave exploration, and outdoor events involving schools, universities, and community organisations. Together, these activities demonstrate the geopark's potential to integrate environmental education with local economic development. However, increasing visitor numbers also place greater pressure on environmentally sensitive geosites, particularly karst

ecosystems and river corridors. Therefore, tourism development should be supported by spatial planning instruments that regulate conservation zoning, visitor carrying capacity, and development intensity to ensure that environmental conservation remains the primary foundation of sustainable geopark management. Consistent with the Blue Economy approach, sustainable tourism should balance environmental protection, community welfare, and cultural preservation (Sumarmi et al., 2020), while collaborative governance and stakeholder participation are essential to maintaining environmental quality and generating long-term socio-economic benefits (Marlina et al., 2020; Yayun et al., 2025).

C. Community-Based Geopark Conservation

Community participation plays a central role in supporting sustainable conservation in the Silokek Geopark. Local communities actively contribute to environmental protection through customary institutions, conservation programmes, and tourism-related activities that strengthen both environmental sustainability and local livelihoods.

a. Rimbo Larangan (Protected Forest)

As explained by Informant 1: *“Geopark conservation efforts include the designation of Rimbo Larangan as a protected forest area covering approximately 4,500 hectares, established through Nagari Regulation No. 1 of 2002. This regulation prohibits logging activities and imposes social sanctions on violators. The primary objective of Rimbo Larangan is to function as a water catchment and storage area that supports community needs for agriculture and household use.”*

The Rimbo Larangan system demonstrates how customary regulations function as an effective community-based mechanism for protecting forests and maintaining ecosystem services, particularly water resources.

b. Lubuk Larangan (Protected River)

Source 2 explained: *“Several geopark areas have implemented the Lubuk Larangan concept in certain rivers that are collectively agreed upon as no-fishing zones. Community members who violate these rules are subject to fines in accordance with agreements established in each region that applies Lubuk Larangan.”*

Lubuk Larangan integrates customary rules with conservation objectives by protecting river ecosystems through community-based monitoring and social sanctions.

c. Foster Tree Program

Based on the explanation of Source 7: “*The Pohon Asuh Program is a forest conservation initiative developed to attract financial support from various stakeholders and is implemented at the Sumpur Kudus geosite.*”

The Foster Tree Program represents an incentive-based conservation approach that encourages stakeholder participation while supporting forest restoration and community welfare.

d. Disaster-Resilient Nagari

In addition to traditional conservation practices, Source 2 explained: “*The community has also actively established Nagari Siaga Bencana (Disaster-Resilient Villages) as a strategic step to build resilience and self-reliance in facing natural disasters, particularly in the Silokek geosite area*”. This explanation regarding *Nagari Siaga Bencana* is further reinforced by the statement of Source 1, the establishment of Disaster-Resilient Nagari reflects the community's capacity to integrate disaster risk reduction into geopark conservation through collaboration between local government, Pokdarwis, and community organizations.

Community-based conservation in the Silokek Geopark is reflected in several traditional management practices, including *Rimbo Larangan*, *Lubuk Larangan*, and the *Pohon Asuh* program. These initiatives demonstrate the integration of local wisdom and environmental conservation (Figure 3 and 4).



Figure 3 Rimbo Larangan



Figure 4 Lubuk Larangan

(Source: Silokek Geopark Daily Management Board 2023)

Community participation is also reflected in the tourism services provided by residents in the Silokek Geopark area. Local communities play an important role not only in maintaining environmental sustainability but also in supporting tourism activities by providing various facilities for visitors.

“Local communities provide supporting facilities such as homestays, food stalls, ATV rentals, and camping equipment for tourists visiting the Silokek Geopark area.” (Informant 8 – pokdarwis Kampung adat Sijunjung).

Community participation plays a central role in supporting both environmental conservation and sustainable tourism development in the Silokek Geopark. Consistent with Ariffin et al. (2023), meaningful citizen engagement strengthens heritage conservation through active local stewardship and collaborative management. In the Silokek Geopark, local communities contribute to conservation through customary institutions such as *Rimbo Larangan*, *Lubuk Larangan*, and the *Pohon Asuh* programme, while simultaneously supporting the local economy by providing homestays, food stalls, ATV rentals, camping equipment, and other tourism services. These findings are also consistent with Bachri et al. (2023), who emphasise that sustainable tourism depends on collaboration among local communities, tourism managers, and other stakeholders. Although community participation has effectively supported conservation, these initiatives remain largely community-driven and have not yet been fully integrated into statutory spatial planning instruments.

The findings further demonstrate that geopark governance has been strengthened through collaboration among the Geopark Management Agency, the Sijunjung Regency Government, Nagari governments, Tourism Awareness Groups (*Pokdarwis*), and local communities. This collaborative arrangement reflects the importance of multi-level governance in coordinating conservation and tourism policies across different institutional levels, consistent with Devi et al. (2025). Although the Silokek Geopark Masterplan and the Decree establishing the Geopark Management Agency provide an institutional framework for management, policy integration remains limited. Consequently, key spatial planning instruments—including conservation zoning, buffer zones, visitor carrying capacity, land-use control, and sustainable tourism zoning—should be more comprehensively incorporated into regional spatial planning to ensure long-term environmental conservation and sustainable tourism development.

The findings indicate that the Silokek Geopark has strong potential to become a leading tourism destination in West Sumatra due to its outstanding geodiversity, active community participation, and collaborative governance. However, achieving this vision requires stronger integration of conservation objectives into statutory spatial planning through conservation zoning, visitor carrying capacity management, and coordinated multi-level governance. Such integration will ensure that tourism development enhances, rather than compromises, the long-term sustainability of the geopark.

CONCLUSION

This study examined sustainable conservation practices in the Silokek Geopark, Sijunjung Regency, West Sumatra, using the Sustainable Geopark Management Framework. The findings demonstrate that the geopark possesses significant geological, ecological, and cultural resources that provide a strong foundation for sustainable geotourism. Community-based conservation initiatives, including *Rimbo Larangan*, *Lubuk Larangan*, the *Pohon Asuh* programme, and Disaster-Resilient Nagari, have contributed substantially to protecting natural resources while supporting local livelihoods and tourism development.

The study also reveals that collaborative governance involving the Geopark Management Agency, the Sijunjung Regency Government, Nagari governments, Tourism Awareness Groups (*Pokdarwis*), and local communities has strengthened conservation efforts. However, conservation initiatives remain largely community-driven and have not yet been fully integrated into statutory spatial planning instruments. Stronger policy integration is therefore required through conservation zoning, land-use regulation, visitor carrying capacity management, and coordinated multi-level governance to ensure that tourism development does not compromise environmental sustainability.

This study contributes to the planning literature by demonstrating that sustainable geopark management depends not only on conserving geological heritage but also on integrating community-based conservation, collaborative governance, and spatial planning within a single management framework. The findings provide practical guidance for local governments in incorporating geopark conservation into regional spatial planning and tourism policies, thereby supporting balanced regional development while safeguarding geoheritage and ecosystem integrity.

This study is limited to a single case study of the Silokek Geopark. Future research should undertake comparative analyses of multiple geoparks in Indonesia or internationally to examine different governance models and planning approaches. Further studies may also evaluate the effectiveness of spatial planning instruments, conservation zoning, and visitor carrying capacity management in supporting the long-term sustainability of geoparks.

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REFERENCES

Ansori, C., Setiawan, N. I., Warmada, I. W., & Yogaswara, H. (2022). Identification of geodiversity and evaluation of geosites to determine geopark themes of the

- Karangambung-Karangbolong National Geopark, Kebumen, Indonesia. *International Journal of Geoheritage and Parks*, vol 10 issue 1, 1-15. <https://doi.org/10.1016/j.ijgeop.2022.01.001>
- Ariffin, WN. J. W., Noh, N. A., Azinuddin, M., Ibrahim, A., Ghazalli, F. S., & Rahim, E. M. A., (2023). Citizen Engagement In Tangible Heritage Conservation Strategies In Terengganu. *Planning Malaysia: Journal of the Malaysian Institute of Planners*. Vol 21 Issue 1, Page 24-25.
- Barber, A. J., & Crow, M. J. (2003). An evaluation of plate tectonic models for the development of Sumatra. *Gondwana Research*, 6(1),1-28. [https://doi.org/10.1016/S1342-937X\(05\)70642-0](https://doi.org/10.1016/S1342-937X(05)70642-0)
- Bachri, S., Sholeha, A. W., Kurniawati, E., Hakiki, A. R., & Hidiyah, T. M. (2023). Development strategy for special interest tourism (SIT) through community-based ecotourism (CBET) in Perawan Beach to promote a sustainable economy. *Geo Journal of Tourism and Geosites*, 48, 696-708. <https://doi.org/10.30892/gtg.482spl03-1069>
- Bhinekawati, R., Nelloh, LAM, & Abdurahman, O. (2020). The analysis of entrepreneurial intention in rural areas: A case study of Bukit Peramun Geosite in Indonesia. *Geojournal of Tourism and Geosites*, 28 (1), 80-94. <https://doi.org/10.30892/gtg.28106-453>
- BPS (Central Statistics Agency) (2023): Sijunjung Regency in Figures 2023, Indonesia.
- Crofts, R. (2019). Linking geoconservation with biodiversity conservation in protected areas. *International Journal of Geoheritage and Parks*, 7(4), 211-217. <https://doi.org/10.1016/j.ijgeop.2019.12.002>
- Devi, M. K., Miharja, M., Furqon, A. (2025). What Is the Role of Sub-National Authorities in Public Transport Policy? -A Multi-Level Governance Perspective in Indonesia. *Planning Malaysia: Journal of the Malaysian Institute of Planners*, Vol 23 Issue 3, page 425-439.
- Febrianto, H., Osrnita, O., Regina, R., & Pratama, M. I. L. (2022). Kajian potensi Geowisata Nagari Silokek sebagai penunjang Geopark Silokek di Kabupaten Sijunjung. *Geosfera: Jurnal Penelitian Geografi*, 1(1), 10-16. <https://doi.org/10.34312/geojpg.v1i1.14378>
- Gordon, J. E., Crofts, R., Gray, M., & Tormey, D. (2021). Including geoconservation in the management of protected and conserved areas matters for all of nature and people. *International Journal of Geoheritage and Parks*, 9(3), 323-334. <https://doi.org/10.1016/j.ijgeop.2021.05.003>
- Gray, M. (2019). Geodiversity, geoheritage and geoconservation for society. *International Journal of Geoheritage and Parks*, 7(4), 226-236. <https://doi.org/10.1016/j.ijgeop.2019.11.001>
- Hazar, B. A. L., Sumarmi, S., Astina, I. K., & Shrestha, R. P. (2024). Mappalili ceremony in supporting UNESCO version of cultural tourism in Maros- Pangkep geopark. *Geojournal of Tourism and Geosites*, 52(1), 360-371. <https://doi.org/10.30892/gtg.52127-1212>
- Huq, S. A., & Puthuvayi, B. (2023). Stakeholders' satisfaction assessment in heritage conservation: Case study of a project performance model for Thiruvananthapuram Fort Area, Kerala, India. *Frontiers of Architectural Research*, xxx.
- Ilieş, D. C. (2009). Geosites-geomorphosites and relief 1. *GeoJournal of Tourism and*

- Geosites*, 3(1), 78–86.
- Irwandi, A., Rahmaini, I. S., Indrizal, E., Ermayanti, E., Yuswir, B. D., & Zefnihan, Z. (2024). Geotourism contribution to sustainable development in Ranah Minang Silokek Geopark Sijunjung district. *International Journal of Geotourism Science and Development*, 4(1), 19-31. <https://doi.org/10.23887/mkg.v25i1.75003>
- Li, R., Gao, J., He, M., Jing, J., Xiong, L., Chen, M., & Zhao, L. (2023). Effect of rock exposure on runoff and sediment on karst slopes under erosive rainfall conditions. *Journal of Hydrology: Regional Studies*, 50(May), 101525. <https://doi.org/10.1016/j.ejrh.2023.101525>
- Mallinis, G., Domakinis, C., Kokkoris, I. P., Stefanidis, S., Dimopoulos, P., & Mitsopoulos, I. (2023). MAES implementation in Greece: Geodiversity. *Journal of Environmental Management*, 342(February), 118324. <https://doi.org/10.1016/j.jenvman.2023.118324>
- Marlina, S., & Astina, I. K. (2020). Sustainable marine ecotourism management: A case of marine resource conservation based on local wisdom of bajo mola community in wakatobi national park. *GeoJournal of Tourism and Geosites*, 32(4), 1317-1323. <https://doi.org/10.30892/gtg.32419-575>
- Mucivuna, V. C., Garcia, M. da G. M., Reynard, E., & Rosa, P. A. da S. (2022). Integrating geoheritage into the management of protected areas: A case study of the Itatiaia National Park, Brazil. *International Journal of Geoheritage and Parks*, 10(2), 252–272. <https://doi.org/10.1016/j.ijgeop.2022.04.004>
- Németh, K., & Gravis, I. (2022). Geoheritage and geodiversity elements of the SW Pacific: A conceptual framework. *International Journal of Geoheritage and Parks*, 10 (4), 523–545. <https://doi.org/10.1016/j.ijgeop.2022.09.001>
- Nyimbili, F., & Nyimbili, L. (2024). Types of purposive sampling techniques with their examples and application in qualitative research studies. *British Journal of Multidisciplinary and Advanced Studies*, 5(1), 90-99. <https://doi.org/10.37745/bjmas.2022.0419>
- Pemerintah Kabupaten sijunjung, (2019). Silokek Geopark Masterplan. Bappeda Kabupaten Sijunjung.
- Reinhart, H., Rafida, MR, Sofie, T., Putra, RD, Matoka, MCR, Maulita, NS, & Baiquni, M. (2023). Assessment of geological diversity, geosites, and geotourism potential at Menoreh Mountain for designation of geopark area. *International Journal of Geoheritage and Parks*, 11 (3), 385–406. <https://doi.org/10.1016/j.ijgeop.2023.05.005>
- Ríos, C. A., Amorocho, R., Villarreal, C. A., Mantilla, W., Velandia, F. A., Castellanos, O. M., Muñoz, S. I., Atuesta, D. A., Jerez, J. H., Acevedo, O., Vargas, M., Caballero, V. M., Goso, C. A., & Briggs, A. (2020). Chicamocha Canyon Geopark project: A novel strategy for the socio-economic development of Santander (Colombia) through geoeducation, geotourism and geoconservation. *International Journal of Geoheritage and Parks*, 8(2), 96–122. <https://doi.org/10.1016/j.ijgeop.2020.05.002>
- Sulistyo, A., Rijanta, R., Hadna, A. H., & Giyarsih, S. R. (2023). Group of community-based tourism awareness (Pokdarwis) strategies in addressing conflicts in utilization and conservation of the environment. In *Forum Ilmu Sosial* (Vol. 50, No. 2). DOI: <https://doi.org/10.15294/fis.v50i2.44799>

- Sumarmi, K. E., & Aliman, M. (2020). Community based tourism (CBT) to establish blue economy and improve public welfare for fishing tourism development in klatak beach, tulungagung, Indonesia. *GeoJournal of Tourism and Geosites*, 31(3), 979-986. <https://doi.org/10.30892/gtg.31307-530>
- Sumarmi, S., & Untari, S. (2022). Ungapan Beach: Partner based management to improve a sustainable economy. *Fronteiras*, 11(1), 181–193. <https://doi.org/10.21664/2238-8869.2022v11i1.p181-193>
- Xu, K., & Wu, W. (2022). Geoparks and geotourism in China: A sustainable approach to geoheritage conservation and local development—A review. *Land*, 11(9). <https://doi.org/10.3390/land11091493>
- Yayun, Y., Siow, M. L., Ibrahim, R., Aziz, F. A. (2025). Exploring Cultural Development Barriers to Sustainable Rural Tourism in Guilin, China: Insights from The Stakeholder Perspective. Planning Malaysia: *Journal of the Malaysian Institute of Planners*. Vol. 23 Issue 3. Page 273-289.

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