



Community Empowerment for Sustainable Geotourism in Sipinsur Geosite: Social and Economic Dimensions

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ABSTRACT

This study examines how community participation can be strengthened in the development of geotourism at Sipinsur Geosite, located within the Toba Caldera Global Geopark, North Sumatra. Despite increasing tourist arrivals, local community involvement remains limited, largely confined to informal economic activities, and shows minimal participation in planning and decision-making processes. Using a qualitative approach, this research draws on semi-structured interviews, field observations, and focus group discussions involving local communities, government representatives, tourism managers, and visitors. The data were analyzed using thematic analysis to identify patterns of participation and key development challenges. The findings reveal that the main barriers to meaningful participation include limited access to training, inadequate infrastructure, weak stakeholder coordination, and the absence of structured mechanisms for community involvement. This results in a gap between tourism growth and local empowerment. This study highlights the need to shift from passive community involvement to a more inclusive, participatory governance model. Strengthening local capacity, improving collaboration among stakeholders, and integrating community voices into decision-making are essential to ensure more equitable and sustainable tourism development. By promoting a community-centered approach, Sipinsur Geosite can evolve into a more resilient destination that supports environmental conservation while enhancing local livelihoods.

Keywords: community participation; geotourism; sustainable tourism; stakeholder collaboration; Sipinsur Geosit

1. Introduction

Tourism has evolved far beyond its traditional purpose of recreation and leisure. Today, it plays a vital role in stimulating economic development, preserving cultural identity, and empowering local communities. Around the world, governments are increasingly adopting tourism as a strategic tool to drive inclusive growth. In this context, sustainable tourism has gained momentum—prioritizing long-term environmental balance, cultural integrity, and community participation.

Among the various models of sustainable tourism, geotourism stands out for its unique emphasis on geological heritage, education, and place-based storytelling. Geotourism encourages visitors to explore landscapes shaped by natural processes, fostering appreciation for earth sciences while supporting local economies. This model has gained traction globally, particularly in regions rich in natural wonders and cultural diversity. Indonesia, with its vast geological assets and multi-ethnic communities, holds significant potential to lead in this area.

One promising destination is the Sipinsur Geosite in North Sumatra, nestled within the Toba Caldera Global Geopark, which has been recognized by UNESCO since 2020 (UNESCO, 2020). This site offers stunning views of Lake Toba, surrounded by pine forests and unique topography shaped by volcanic activity. Over the years, the number of visitors to Sipinsur has steadily increased, signaling growing interest in nature-based tourism. However, behind the growth in footfall lies a deeper challenge: ensuring that local communities are not just passive observers but active beneficiaries and decision-makers.

At present, most residents participate in tourism through informal roles such as food vendors, parking attendants, or tour guides. Their contributions, while valuable, remain disconnected from strategic planning and management (Nasution et al., 2022). This limited involvement reflects a broader issue: the absence of structured platforms and support systems that enable communities to co-create and co-lead tourism initiatives.

Several constraints hinder greater engagement. Inadequate training, weak infrastructure, and a lack of stakeholder synergy continue to obstruct meaningful participation (Anggraini, 2023). Moreover, the site suffers from underdeveloped attractions and insufficient promotional efforts, making it difficult to compete with more established tourist destinations (Siahaan et al., 2024).

Research shows that community-driven tourism models lead to more sustainable outcomes. When local people are empowered with knowledge, skills, and decision-making authority, they become champions of conservation and innovation. The Community-Based Tourism (CBT) model, which emphasizes grassroots leadership and shared responsibility, has demonstrated success across various global settings (Jamal & Stronza, 2009).

This study focuses on the Sipinsur Geosite to explore how geotourism can move beyond token involvement to foster real empowerment. By analyzing existing participation models, identifying obstacles, and examining stakeholder dynamics, this paper aims to offer practical insights and policy recommendations. This study aims to help shape a geotourism model that is inclusive, resilient, and community-led—ensuring mutual benefits for residents and the environment.

In addition, the research team conducted direct observations and facilitated focus group discussions (FGDs) to gather diverse perspectives. The FGDs involved representatives from surrounding communities, local government agencies, destination managers, and domestic tourists who had visited Sipinsur. This diverse mix allowed for a richer dialogue on tourism challenges, experiences, and expectations.

To ensure data credibility, triangulation was conducted by cross-checking interview responses with observational findings and FGD outcomes. For instance, community claims about infrastructure issues were validated through on-site visits and further confirmed through discussions with local authorities and tourist respondents.

The qualitative approach allowed the researchers to interpret social dynamics in real-time settings (Creswell, 2014). Semi-structured interviews offered flexibility to explore participants' views, while participatory observation enabled the researchers to witness firsthand how tourism activities unfold and how residents interact with visitors (Spradley, 2016). FGDs further enriched the understanding of collective challenges and community aspirations.

The researchers analyzed the data using the Miles and Huberman (2014) interactive model, which involves data reduction, data display, and conclusion drawing. The researchers filtered and organized relevant data into thematic categories, then synthesized key insights from recurring patterns and stakeholder narratives. based on recurring patterns and stakeholder narratives.

2. Literature Review

2.1 Sustainable Geotourism and Local Development

Geotourism has emerged as a strategic approach within sustainable tourism, emphasizing the integration of geological heritage, environmental conservation, and community well-being. Unlike conventional tourism models that prioritize economic gain, geotourism focuses on preserving the authenticity of natural landscapes while simultaneously enhancing educational and cultural values. According to Dowling and Newsome (2018), geotourism is not merely about visiting geological sites but involves interpreting earth systems and promoting

environmental awareness among visitors. This approach aligns with the broader sustainability agenda, which balances environmental protection, socio-cultural integrity, and economic development.

International frameworks further reinforce this perspective. The UNESCO Global Geopark initiative highlights that geotourism should contribute to local development by empowering communities and fostering place-based identity (UNESCO, 2020). Similarly, the UNWTO emphasizes that sustainable tourism must generate long-term benefits for host communities while maintaining ecological balance (UNWTO, 2023). In this context, geotourism is increasingly recognized as a tool for inclusive development, particularly in regions with rich geological and cultural assets such as the Toba Caldera area.

However, the success of geotourism is not solely determined by natural attractiveness. Ruiz-Pedrosa, R. M., & Serrano, E. (2025) argue that its sustainability largely depends on how effectively local communities are integrated into tourism development processes. Without meaningful participation, geotourism risks becoming externally driven and economically exclusive. Therefore, understanding the role of community involvement is essential in evaluating the sustainability of geotourism destinations.

2.2 Community Participation in Tourism Development

Community participation is widely regarded as a fundamental principle in sustainable tourism development. It ensures that local communities are not merely passive beneficiaries but active agents in shaping tourism outcomes. Arnstein (1969) conceptualizes participation through the "ladder of citizen participation," which ranges from non-participation to full citizen control. This framework highlights that not all forms of participation reflect genuine empowerment; in many cases, involvement remains superficial or symbolic.

Expanding this perspective, Pretty (1995) categorizes participation into several levels, from manipulative participation to self-mobilization. These typologies emphasize that meaningful participation involves decision-making power, not just involvement in implementation. In tourism contexts, this distinction is critical, as communities are often limited to low-level roles such as service provision without being included in strategic planning.

Cohen and Uphoff (1980) further argue that participation should be understood as a multidimensional process, encompassing decision-making, implementation, benefit-sharing, and evaluation. In practice, however, many tourism destinations in developing regions still exhibit limited participation, with local communities lacking access to information, resources, and institutional support (Nasution et al., 2022). This gap between theoretical ideals and practical realities underscores the need for more inclusive, structured approaches to community engagement in tourism development.

2.3 Community-Based Tourism (CBT) and Local Empowerment

Community-Based Tourism (CBT) has been widely promoted as an alternative model that prioritizes local empowerment and equitable benefit distribution. CBT shifts the focus from externally controlled tourism development to community-led initiatives in which residents actively participate in planning, management, and decision-making (Jamal & Stronza, 2009). This model emphasizes that sustainable tourism cannot be achieved without strengthening local communities' capacity and autonomy.

Scheyvens & Keyser-Van der Watt (2021) provide a comprehensive framework for understanding empowerment within CBT, identifying four key dimensions: economic, social, psychological, and political. Economic empowerment refers to communities' ability to generate income from tourism activities, while social empowerment relates to improved community cohesion and quality of life. Psychological empowerment involves increased confidence and a sense of ownership, whereas political empowerment refers to participation in decision-making processes.

In many cases, tourism development achieves only partial empowerment. Rachmawati (2020) notes that while economic opportunities may be accessible, political empowerment often remains limited, as communities are excluded from governance structures. This imbalance can lead to dependency on external actors and reduce the long-term sustainability of tourism initiatives. Therefore, evaluating the extent of empowerment across these dimensions is crucial in assessing the effectiveness of CBT implementation.

2.4. Stakeholder Collaboration and Tourism Governance

The development of sustainable tourism requires effective collaboration among multiple stakeholders, including government institutions, local communities, and private sector actors. Stakeholder theory, introduced by Freeman (1984), emphasizes that organizational success depends on balancing the interests of all relevant actors. In tourism, this implies that development strategies must consider the perspectives and contributions of diverse stakeholders to achieve sustainable outcomes.

Collaborative governance further elaborates this idea by highlighting the importance of joint decision-making and shared responsibility. Ansell and Gash (2008) define collaborative governance as a process in which public and private actors engage collectively in consensus-oriented decision-making. In the context of tourism, this approach is essential for addressing complex challenges such as resource management, infrastructure development, and community engagement.

However, weak coordination among stakeholders often leads to fragmented development and limited community participation. B. Kairupan et al. (2023) argue that the absence of inclusive governance structures can marginalize local communities and hinder the effectiveness of tourism initiatives. This issue is particularly relevant in developing regions, where institutional capacity and stakeholder alignment are often limited (Ruiz-Pedrosa, R. M., & Serrano, E, 2025; Cole, 2006). Strengthening collaboration and governance mechanisms is therefore critical for ensuring that tourism development is both inclusive and sustainable.

2.5 Research Gap

Despite the growing body of literature on geotourism and community participation, existing studies have largely focused on the physical potential of destinations, infrastructure development, and economic impacts. Limited attention has been given to the depth of community participation and the governance structures that shape stakeholder interactions, particularly in the context of geotourism destinations in Indonesia.

Previous studies on geotourism in North Sumatra, including those by Siahaan et al. (2024), primarily examine the natural and economic potential of geosites, while studies on tourism infrastructure (Lestari, 2023) emphasize accessibility and facility development. However, these studies do not sufficiently address how local communities are positioned within decision-making processes or how stakeholder dynamics influence participation.

Therefore, this study aims to fill this gap by analyzing community participation in the development of Sipinsur Geosite through a governance and empowerment perspective. By integrating concepts of geotourism, community-based tourism, and stakeholder collaboration, this research provides a more comprehensive understanding of how sustainable tourism can be achieved through inclusive and participatory approaches.

3. Methods

This research used a descriptive qualitative method to explore how communities engage with geotourism development. Researchers collected data through semi-structured interviews with 12 informants, consisting of residents, village leaders, tourism entrepreneurs, and government officials from the local tourism office. The selection of participants was based on their direct involvement or knowledge related to tourism development at SipinsurGeosite.

To ensure the credibility and depth of the research findings, the researchers applied triangulation by comparing and synthesizing data from three primary sources: semi-structured interviews, direct field observations, and Focus Group Discussions (FGDs). This methodological approach enabled the identification and validation of recurring themes that emerged across diverse perspectives.

Concerns shared in interviews—such as limited infrastructure, minimal community involvement in decision-making, and the exclusion of local tourism groups like "Pokdarwis"—were reinforced through field observations and further substantiated during FGDs. Participants also emphasized the importance of aligning government policies with local realities, underscoring the need for community empowerment and capacity building.

FGDs additionally brought forward views from domestic tourists, who echoed concerns about inadequate public amenities and highlighted the site's potential to offer authentic, community-led tourism experiences.

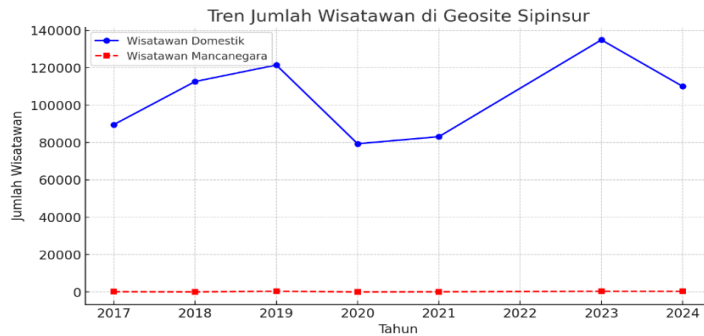


Figure 1. Trends in the Number of Tourists at SipinsurGeosite

The graph illustrating tourism trends at Sipinsur Geosite from 2017 to 2024 offers valuable insights into the site's development trajectory. In 2020, the number of visitors dropped significantly due to the COVID-19 pandemic, which disrupted tourism across the region. Beginning in 2021, the site experienced a steady recovery, with tourist arrivals increasing substantially by 2023. This upward trend highlighted a renewed public interest in nature-based tourism and reaffirmed Sipinsur's appeal as a geotourism destination.

Despite this growth, domestic tourists continued to outnumber international visitors by a wide margin. This imbalance indicates a missed opportunity to attract more foreign tourists and suggests the need for more effective international marketing strategies. Interestingly, in 2024, visitor numbers declined slightly. This dip may be attributed to economic challenges, policy changes, or lingering infrastructure issues. These fluctuations point to the importance of addressing structural barriers to ensure long-term, sustainable development.

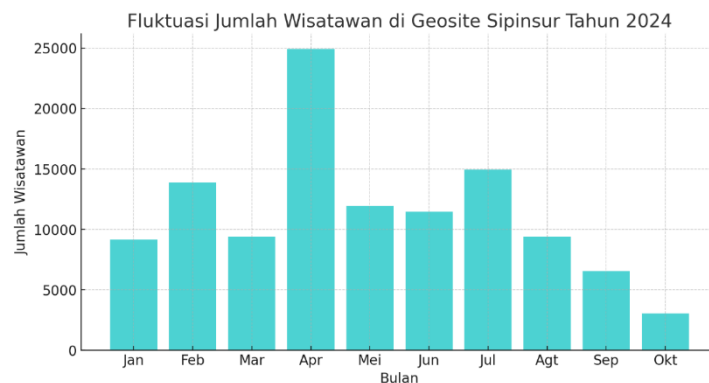


Figure 2. Fluctuation in the Number of Tourists at Sipinsur Geosite in 2024

The graph illustrating tourism trends at SipinsurGeosite from 2017 to 2024 reveals several key developments. Following a sharp decline in 2020 due to the COVID-19 pandemic, tourist arrivals began to recover in 2021, with a marked surge observed in 2023. This rebound reflects a renewed interest in nature-based tourism and highlights Sipinsur's appeal as a post-pandemic travel destination.

Throughout the period, domestic tourists consistently outnumbered international visitors, underscoring the need for stronger marketing efforts to attract foreign travelers. However, in 2024, the site experienced a slight decrease in total visitors. Broader economic conditions, policy changes, or ongoing infrastructure constraints may have contributed to this decline. These fluctuations underscore the importance of strategic planning to ensure consistent, sustainable tourism growth.

Empowering communities is essential to building sustainable tourism destinations. Local involvement enhances ownership, accountability, and environmental stewardship (Cole, 2006). Sipinsur's development depends not only on physical infrastructure but also on building human capital and inclusive governance structures. Other geotourism destinations have shown that when local voices guide tourism planning, communities benefit more equitably while conservation goals are also better achieved (Ruiz-Pedrosa, R. M., & Serrano, E, 2025).

4.2 Community-Based Development of the Sipinsur Geosite in Humbang Hasundutan Regency

The development of the Sipinsur Geosite in Humbang Hasundutan Regency faces real challenges commonly encountered in the field, including narrow, uneven access roads and a lack of public facilities such as restrooms, parking areas, and adequate rest areas. Additionally, partnerships with local businesses, such as tour operators or small and medium-sized enterprises (SMEs), have not yet been optimized. There are complaints from the local community regarding the lack of space to market local specialty products, such as ulos or local coffee, which could actually serve as an additional attraction for tourists. However, in this context, the community's role in overcoming these obstacles has not yet been fully realized.

Community participation in the development of this geosite appears to be minimal, particularly regarding environmental cleanliness. Based on field observations, many tourists still complain about litter scattered across the area due to a lack of awareness among local residents about the importance of maintaining the surrounding environment. Furthermore, government programs aimed at increasing community participation—such as tourism business training—have seen limited outreach, and not all community members have adequate access to or understanding of these programs. Consequently, the local potential that could support the geosite's development is not being fully utilized. Thus, the Sipinsur Geosite should not only become a more developed tourist destination but also a symbol of community pride that is integrated into their daily lives.

Interviews with residents indicate that community participation in developing the Sipinsur Geosite remains relatively low, despite significant potential for community contributions. Although some forms of participation have begun to emerge—such as the operation of small shops, the provision of parking services, and the sale of local souvenirs—this participation is largely individual in nature and has not yet been well organized. Most community members admit they lack sufficient access to information regarding the geosite development plan, so their involvement remains limited to simple economic activities without adequate support.

Low community participation is also evident in the management of cleanliness and environmental conservation around the Sipinsur Geosite. Based on field observations, several points in the tourist area show poorly managed waste. This is due to a lack of coordination between the community, local government, and geosite managers. Additionally, the lack of educational programs and training on geosite-based tourism management also acts as a barrier to active community participation in maintaining and caring for this geosite. In this context, a participatory approach plays a crucial role by involving the local community at every stage, from planning and implementation to evaluation. This aligns with participation theory, which emphasizes the importance of involving communities in both decision-making and implementation. Participation is not only about involvement in activities, but also about having a voice in planning and governance. In this context, horizontal participation refers to community involvement in generating ideas and local solutions, while vertical participation reflects collaboration between communities, government, and other stakeholders in decision-making processes (Muluk et al., 2020; Nasdian, 2014; Arnstein, 1969; Pretty, 1995; UNWTO, 2023).

Another factor contributing to low community participation is the lack of community involvement in decision-making regarding geosite development. Based on discussions with community leaders, they feel that geosite development often involves only the government and site managers, without any consultation or direct community involvement. This reduces the community's sense of ownership and responsibility toward the geosite, ultimately leading to low motivation to participate actively. To increase community participation, a more inclusive and community-based approach is needed. This study found that the community tends to be more engaged when they are directly involved in cooperative activities or entrepreneurship training. One example of success is a community group initiative that conducts regular cleanup activities in tourist areas, thereby raising tourists' awareness of the importance of environmental cleanliness. The formation of community-based working groups, coordinated with geosite managers and the government, is expected to be a solution for increasing participation sustainably.

Through a pilot study of a community-based model, this research found that increasing community involvement in tourism activities—such as photography services, tour guiding, and the provision of local cuisine—can positively impact their economic well-being. The development process involved engaging local community groups through training and mentoring, including waste management and environmental conservation. This approach aligns with the principles of Miles and Huberman, which prioritize testing and refining the model before full implementation. The results demonstrate that community-participatory management can enhance the appeal of the Sipinsur Geosite as an eco-friendly tourist destination while

strengthening local economic sustainability. The uniqueness of "Instagram-worthy" photo spots and community involvement in service provision add value that attracts both domestic and international visitors. With this strategy, the Sipinsur Geosite becomes not only a recreational site but also a platform for empowering local communities in sustainable tourism management.

The development of a participatory model that actively involves the community has significantly improved service quality at the Sipinsur Geosite across several areas. The level of community participation in the management of the Sipinsur Geosite is based on several key aspects, namely restaurant management, management of public facilities, environmental cleanliness, and raising environmental awareness. Regarding restaurant management, residents operate the restaurants and offer local specialties, with a 80% participation rate. This has a positive impact, not only on the local economy but also on increasing the site's appeal to tourists. Public facility management, where the community participates in maintaining facilities such as restrooms, parking areas, directional signs, and trash bins, has a participation rate of 70%, creating a clean, comfortable environment for visitors. Environmental cleanliness management, with community participation at 75%, reflecting the community's commitment to keeping the tourist area clean, comfortable, and attractive to visitors. Enhanced environmental awareness, where the community actively participates in environmental conservation activities around the geosite with a participation rate of 60%, indicating that the community is not only involved in the practical aspects of management but also plays a role in preserving the environment surrounding the geosite. Overall, this table indicates that community participation at the Sipinsur Geosite significantly improves service quality and the sustainability of the tourist area, in terms of the economy, cleanliness, and environmental awareness.

However, although this master plan was designed with long-term goals that directly involve the community, its implementation is not without challenges. One obstacle is the lack of community involvement in the initial planning and decision-making stages. Most community members are not yet fully aware of the economic potential of geosite development. This often leads to a gap between development goals and their implementation on the ground. In reality, the community's understanding of the long-term benefits of geosite development remains limited, and they are more focused on daily needs. Therefore, effective community-based development requires enhanced understanding and training for residents so they can contribute maximally to the sustainable management of the Sipinsur Geosite.

Based on the research findings, it can be concluded that the participatory development of the Sipinsur Geosite can provide significant benefits not only to visitors but also to the local community. By promoting cultural and educational values, this area serves not only as a tourist destination but also as a means to raise awareness and knowledge about local geology and culture. This approach is expected to preserve the environment while fostering local economic growth through sustainable tourism. Overall, the Sipinsur Geosite has great potential as an attractive tourist destination. With appropriate government support and community participation, along with more vigorous promotion, this site could become one of the premier tourist destinations in Humbang Hasundutan Regency. Improvements to infrastructure and supporting facilities are also expected to enhance the visitor experience, enabling the Sipinsur Geosite to continue to grow and bring benefits to the local community.

Community-based tourism development offers opportunities to create deeper and more meaningful travel experiences. In this approach, local communities become an integral part of destination management—not merely as beneficiaries but also as key actors in showcasing the uniqueness of their region (Eddyono, 2021; Jamal & Stronza, 2009). Through active involvement, communities can directly contribute to creating authentic experiences for tourists, such as cultural interactions, local products, and educational activities that reflect local knowledge and traditions (Ruiz-Pedrosa, R. M., & Serrano, E, 2025; UNWTO, 2023). Furthermore, community participation in sharing local knowledge—such as historical narratives, local stories, and information about the natural environment—can enrich the overall tourist experience. In this way, tourists not only observe but also learn and connect more deeply with the destination. This kind of experience not only improves visitor satisfaction but also increases awareness of the importance of preserving local culture and the environment (UNWTO, 2023).

Based on interviews with residents, the development of Sipinsur Geosite reflects both strengths and challenges. The site's main strengths lie in its natural landscape, including panoramic views of Lake Toba, Samosir Island, Sibidang Island, and the surrounding pine forests, which create a unique and attractive environment for

visitors. However, several limitations still need to be addressed. Accessibility remains a challenge, particularly for visitors from outside the region, due to underdeveloped transportation routes. In addition, limited supporting facilities such as accommodation and food services reduce visitor comfort and overall experience. Improving infrastructure is therefore essential to support tourism development. Better roads, transportation systems, and public facilities can increase accessibility and attract more visitors. This not only enhances the tourist experience but also creates greater opportunities for local communities to participate in economic activities, such as transportation services, food businesses, and the sale of local products. In this context, infrastructure development plays an important role in strengthening community participation and supporting sustainable tourism. Improved access and facilities can help expand local involvement, increase economic benefits, and contribute to the long-term sustainability of the destination (UNWTO, 2023; Ruiz-Pedrosa, R. M., & Serrano, E, 2025).

In terms of opportunities, the Sipinsur Geosite has great potential to develop into a more well-known tourist destination. Awareness of the importance of nature-based tourism is growing, and tourists' interest in exploring new places that offer natural beauty is on the rise. However, challenges also exist in developing the Sipinsur Geosite. Competition with other, already well-known tourist attractions around Lake Toba may make it difficult for Sipinsur to receive the attention it deserves. Additionally, the potential negative environmental impacts from increased visitor numbers must be managed wisely. Therefore, a participatory development approach is crucial to involve the local community in tourism management and development. By involving residents, they can contribute to environmental conservation while reaping the economic benefits of sustainable tourism development.

Although Sipinsur Geosite boasts extraordinary natural beauty, it faces several shortcomings that hinder its potential as a premier tourist destination. One of the main shortcomings is the lack of adequate facilities and infrastructure at the site. Residents have noted that the available facilities are far from adequate when compared to other tourist attractions such as the Hutaginjang Geosite. This serves as a barrier for visitors seeking comfort and convenience during their travels, thereby impacting their overall experience at the Sipinsur Geosite. The incomplete state of these facilities risks diminishing the Sipinsur Geosite's competitiveness against nearby tourist attractions. Dissatisfaction with facilities and infrastructure may lead visitors to prefer other destinations that offer a better experience. Therefore, it is crucial for management to identify and plan the development of necessary facilities promptly. Residents can play an active role in this process by providing input on which facilities are most needed to enhance the appeal of Geosite Sipinsur. By involving the community in decision-making and facility development—such as the construction of a prayer room and photo spots—managers can ensure that the facilities built align with visitors' needs and support the preservation of local cultural values. Collaboration between managers, the community, and the local government is essential to address these shortcomings and establish Geosite Sipinsur as an attractive and welcoming tourist destination for all visitors.

The Sipinsur Geosite has great potential to become a premier tourist destination thanks to its unique natural attractions. The breathtaking views of Lake Toba and the surrounding islands, including Samosir and Sibandang, make Sipinsur a location with its own distinct charm. The beauty of this natural panorama not only offers a stunning visual experience but also serves as an ideal backdrop for a range of tourism activities, from photography to hiking. By leveraging these attractions, the Sipinsur Geosite can attract tourists seeking authentic natural beauty. By providing adequate facilities and involving the local community in tourism management, the Sipinsur Geosite can become a destination that supports nature conservation while providing economic benefits to the local community. This is an opportunity to create tourism that is not only profitable but also sustainable. Engaging the community in the development process will ensure that they receive direct benefits from the growing tourism industry. The Sipinsur Geosite faces several threats that could affect its appeal and visitor numbers, including the development of other tourist attractions in the surrounding area. One of the main competitors identified by the community is the Hutaginjang Geosite (Panatapan Hutaginjang). The existence of this tourist attraction poses a serious challenge for Sipinsur, as both offer similar natural scenery, namely panoramic views of Lake Toba and the beauty of the surrounding nature. In the face of this threat, a participatory approach is key. By involving the community in the development and management of the Sipinsur Geosite, the Sipinsur Geosite can create a more authentic and engaging experience for visitors. Efforts to improve facilities, enhance promotion, and create activities that engage tourists can help draw attention back to Sipinsur.

4.3 Challenges in the Development of the Sipinsur Geosite Based on Community Participation in Humbang Hasundutan Regency

Interviews with informants revealed that one of the main obstacles was the lack of facilities and infrastructure. Based on interviews with the community, the facilities at the Sipinsur Geosite are still considered inadequate when compared to other tourist attractions, such as the Hutaginjang Geosite. Facilities deemed lacking include, for example, a prayer room and photo spots—which are key attractions for visitors—while other facilities, such as parking lots, directional signs, and restrooms, are already adequate. These facility shortcomings can reduce visitor comfort and negatively impact the tourist experience, necessitating the addition and improvement of such amenities. In addition to facility issues, competition with other similar tourist attractions also poses a significant barrier. Geosite Hutaginjang, located not far from Geosite Sipinsur, is the primary competitor in terms of natural tourism appeal. Both locations offer similar natural scenery, giving tourists another option that is not significantly different. Therefore, Geosite Sipinsur needs to adopt more effective marketing strategies and highlight its unique features, such as promoting local culture and offering educational activities for tourists.

In addition, infrastructure issues at the Sipinsur Geosite also pose a significant obstacle to the development of this tourist attraction. Several facilities, such as the guardrails separating the activity zone from hazardous areas, still need improvement to ensure visitor safety. Without adequate and safe facilities, visitors will feel uncomfortable and be reluctant to visit. Furthermore, adding facilities such as attractive photo spots is essential to enhance the visitor experience. Photo spots can serve as key attractions that entice tourists to visit and share their experiences on social media, boosting the popularity of the Sipinsur Geosite.

Another significant issue is the reluctance of some community members to cede their land for the development of the Sipinsur Geosite. Some residents are unwilling to donate their land for the district government's proposed development project. This poses a major challenge to efforts to build the infrastructure and facilities needed to support the smooth operation of the Geosite. This disagreement may stem from fears of potential negative impacts, such as environmental changes and the loss of access to natural resources they have managed for years. Therefore, the government and the community must adopt a more humanistic and inclusive approach to reach a mutually beneficial agreement. The opposition of some community members to this land transfer may stem from a lack of understanding regarding the long-term benefits that can be derived from participatory-based tourism development. Consequently, the government must conduct outreach and dialogue with local communities regarding the potential benefits, whether in terms of economic growth through tourism or the preservation of the environment and local culture. Intensive outreach highlighting the positive impacts of tourism can help alleviate community concerns and encourage greater support for the development plan.

In addition, there needs to be closer collaboration between local governments, communities, and other stakeholders, such as local businesses and tourism organizations. With the involvement of various parties, the development of the Sipinsur Geosite can be better coordinated and support the sustainability of the tourism program. For example, community involvement in the management of tourist attractions can foster a sense of ownership and responsibility for the conservation of the Geosite. In this context, community participation extends beyond the role of mere users; it also involves acting as stewards who help safeguard the environmental sustainability and existing facilities. Overall, although there are various challenges in developing the Sipinsur Geosite, these obstacles can be overcome through the right approach and strong collaboration between the community and the government.

Some of the challenges that may be encountered in the community-based development of the Sipinsur Geosite include: Limited human resources; local communities may not yet possess adequate skills or knowledge in sustainable tourism management. Training and education are necessary to enable them to play an optimal role. Limited human resources represent a significant challenge in the development of the Sipinsur Geosite. Many residents lack adequate skills and knowledge in tourism management, particularly in sustainable tourism principles. The community may have only traditional experience in managing natural resources but is not accustomed to the more structured, planned concepts of tourism area management. Therefore, training programs involving various stakeholders—such as the government, educational institutions, and non-governmental organizations—are needed to enhance the local community's capacity to manage the geosite professionally.

Social and Economic Changes: Community participation can be hindered by the social changes that accompany tourism. Some individuals or groups may feel threatened by changes to their way of life or by the loss of access to resources they previously had. The social and economic changes resulting from the tourism-based development of the Sipinsur Geosite often present unique challenges for local communities. One potential social impact is a shift in lifestyle and interaction patterns among individuals. Communities that previously lived simpler lives focused on agriculture or other local activities now face demands to adapt to a more modern tourism sector. Economically, while geosite development can bring new income opportunities for the community, not all individuals or groups benefit equally.

The development of tourism can also create economic disparities within local communities. While some groups benefit directly from tourism activities, others who are not involved may feel excluded. This situation can lead to dissatisfaction and even social conflict if not managed properly. Therefore, geosite managers and stakeholders need to ensure that tourism development is inclusive and provides equal opportunities for all community members. Without proper planning and coordination, challenges such as limited community participation, weak institutional support, inadequate infrastructure, and lack of collaboration among stakeholders may hinder sustainable tourism development. In addition, limited cooperation with external partners or investors can also restrict financial resources needed for development. Effective collaboration is essential to ensure that tourism initiatives are well-supported and sustainable in the long term (Jamal & Stronza, 2009; UNWTO, 2023; Ruiz-Pedrosa, R. M., & Serrano, E., 2025).

The lack of regulations issued by the local government to manage tourists visiting the Sipinsur Geosite, as well as inadequate infrastructure maintenance, remains a significant challenge. Additionally, the lack of adequate food options forces visitors to bring their own. To analyze and clarify the community-based development of the Sipinsur Geosite in Humbang Hasundutan Regency, the data presented must include several parameters that can be measured both quantitatively and qualitatively, to ensure that the development can be scientifically validated. One type of data that can be used is survey or interview data from residents and tourists, gathering their opinions and experiences regarding changes at the geosite. Additionally, field observation data on the geosite's physical conditions and facilities—such as accessibility, cleanliness, and tourism support facilities—are crucial for analysis. The parameters to be measured include the level of satisfaction among the community and visitors with the geosite's facilities and management, as well as the level of community involvement in the decision-making process and in the management of the area.

To assess whether the development of the Sipinsur Geosite has progressed, several indicators include year-over-year visitor numbers, improvements in infrastructure quality (e.g., road repairs, facility upgrades), and community participation in the management and conservation of the geosite. This data can be obtained through in-depth interviews with local tourists and residents, which will provide insight into the extent to which they feel involved in the geosite's management and whether they perceive benefits from the development efforts. Based on this data, the analysis can demonstrate the effectiveness of community participation in advancing the geosite and its impact on the sustainability of local tourism. This indicator will help determine whether development is proceeding as planned and whether its implementation yields positive social, economic, and environmental impacts. FGD results indicate that the majority of participants agree on the importance of community involvement in developing the Sipinsur Geosite. Residents recognize that, through their active involvement, the economic benefits generated by tourism can be directly felt, such as job opportunities and the growth of micro, small, and medium enterprises (MSMEs). However, the main challenge identified during the discussion was the inability of most residents to access sufficient information regarding the geosite's potential and its management. This has led to a lack of understanding regarding the importance of nature conservation and sustainability in tourism. Therefore, education and training are essential for improving the quality of human resources in the region.

Conclusions

This study shows that the development of Sipinsur Geosite has strong potential, but its sustainability depends heavily on community involvement. At present, community participation is still limited to basic economic activities and has not yet reached the level of planning and decision-making. This gap reduces the sense of ownership and limits the long-term benefits for residents.

The findings also highlight several key challenges, including limited infrastructure, lack of training, and weak coordination among stakeholders. These issues not only affect the quality of tourism services but also hinder the development of a more inclusive and sustainable system.

Strengthening community-based tourism is therefore essential. This can be achieved by improving access to training, involving local communities in decision-making, and strengthening collaboration among government, community groups, and other stakeholders.

In the long term, a participatory approach can help transform Sipinsur Geosite into more than just a tourist destination. It can become a space where local communities are actively involved, benefit economically, and contribute to environmental conservation. This approach will not only improve the visitor experience but also ensure that tourism development remains sustainable and meaningful for the community.

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