

ASSESSING THE DEVELOPMENT POTENTIAL, FEASIBILITY AND VISITOR ASSESSMENT IN THE SIPINSUR GEOSITE NATURAL TOURISM AREA, TOBA CALDERA GLOBAL GEOPARK, INDONESIA

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Abstract: This study aims to examine the potential of tourism objects, development feasibility, visitor assessment of aspects of travel satisfaction, services and conditions of infrastructure, as well as visitor participation in conservation and the environment. This research was conducted using the analysis method of Analysis of Operation Areas of Natural Tourism Objects and Attractions (AOA-NTOA) and descriptive analysis using survey and interview methods. The research instrument used is the Guidelines for AOA-NTOA issued by the Director General of Forest Protection and Nature Conservation, Ministry of Forestry of the Republic of Indonesia. The results showed that Sipinsur Nature Tourism has three potentials, namely; 1) The beauty of natural scenery with a cool mountain microclimate, the diversity of various types of aesthetic flora and fauna, namely various species of aesthetic trees such as Sumatran pine (*Pinus merkusii*) and red shoot tree (*Syzygium oleana*), various palms, and flower plants; 2) Various exotic fauna such as wild cats and eagles; 3) Camping ground area as a center for adventure tourism activities. The results of the development feasibility analysis were declared feasible to be developed into a more developed tourist attraction with an average feasibility index of 73.98%. Visitors' assessment of the aspect of travel satisfaction shows that the majority visit more than 1 time and disseminate information to other parties. The majority of visitors (80.1%) get information about Sipinsur's natural attractions from friends/relatives. The majority of visits were carried out in groups (96%), namely with groups of friends/professionals 56.56% and family (42.42%). As many as 78.78% of visitors make Sipinsur the main destination, with the most visit duration between 2-4 hours (34.34%). In the aspect of visitor assessment of the service and condition of facilities and infrastructure of tourism objects, the majority of visitors rate like/interested/good, some rate very like/very good/very interested, and only a few rate less good / less attractive on the overall assessment indicators. For the aspect of visitor participation in conservation and the environment, it shows that the majority of visitors reject various irresponsible behaviors and actions and are willing to participate in conservation efforts and preservation of the surrounding environment. The development feasibility analysis was declared feasible to be developed into a more developed tourist attraction. Assessment of tourism satisfaction aspects shows that the majority visit more than once and disseminate information to other parties. The majority of visitors like and have a good impression of aspects of service, facilities, and infrastructure. For the aspect of participation in conservation and the environment, it shows that the majority of visitors are aware of the responsibility and willing to participate.

Key words: development feasibility, ecotourism, Geosite of Sipinsur, participation in conservation, Toba Caldera Global Geopark, tourism development, tourism satisfaction, visitor assessment

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INTRODUCTION

Forests are declared as areas that have many values or benefits that can be used as well as possible. From the context of the national economy, forests have many functions that provide direct and indirect benefits. However, economic studies rarely examine these functions in a holistic and integrated manner. According to Law of the Republic of Indonesia Number

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41 of 1999 concerning Forestry, forests have various economic benefits. One of the benefits in question is aesthetic services for ecotourism activities. According to Manalu and Manik (2021), in the current era of globalization, the tourism industry has become one of the largest suppliers of income in the human economy. Ecotourism not only contributes to the economy but is also a form of sustainable use of natural resources (Sakellari and Skanavis, 2013). Vita and Kyaw (2016) also stated that many studies have found a very strong causal relationship between tourism development and the growth of Gross Domestic Product (GDP). According to Dowling and David (2003), ecotourism is a form of tourism that fosters a learning experience and appreciation of the natural environment or some of its components by the cultural context of the related environment. Ecotourism should be conducted in a manner that enhances the destination's resources while prioritizing the economic viability of its operation. This is in line with the goal of sustainable development, namely promoting development, in particular reducing unemployment and poverty (Gasper et al., 2019).

Indonesia's natural potential is very diverse, one of which is the natural tourism potential of the provinces in Indonesia. Besides Java and Bali, Sumatra is the main destination that attracts tourists through its natural wealth. In particular, North Sumatra is currently developing its natural potential, one of which is Lake Toba. Around 12.1 million domestic tourists and 231,465 foreign tourists visited North Sumatra in 2018 (Anele, 2020). This means that tourism not only brings financial gain to the region but also creates jobs for artisans and indigenous people in North Sumatra.

The tourist attraction in the Lake Toba area and its surroundings cannot be separated from the uniqueness of the landscape and the history of Lake Toba itself as a geotourism. Geotourism is a type of sustainable tourism that focuses on objects in the form of geosites, by offering attractions in the form of visitor knowledge, environmental education and entertainment (Santangelo and Valente, 2020). Geotourism is a tourism concept that combines geological and geographical approaches. These two aspects complement each other, and the combination of the two can result in a comprehensive geotourism concept. This concept explores the potential of what nature offers to humans and how humans are able to manage nature sustainably (Mucivuna et al., 2019; Ólafsdóttir et al., 2018; Santangelo and Valente, 2020; Dowling and Newsome, 2018). According to Chesner (2012), the Toba Caldera in Indonesia is one of the most remarkable volcanic features formed over a long period. Lake Toba is the largest lake in Indonesia (90 x 30 km²) and is also the largest quaternary volcanic-tectonic caldera (giant volcanic crater) in the world. This caldera was formed by a collapsing process after the eruption of the ancient Toba volcano supervolcano, which was then filled with rainwater (Nasution, 2019).

Currently the Toba Caldera has been designated by UNESCO as a Geopark. Geopark is an area that has prominent geological elements including archaeological, ecological and cultural values in it, where local communities are invited to participate to protect and improve the function of natural heritage. Geopark is a concept introduced by UNESCO in 2004 that aims to protect a nationally protected area with a wealth of unique geological heritage and aesthetic value that can be developed in a management model that integrates aspects of conservation, education, and local economic development (UNESCO, 2006). Humbang Hasundutan Regency is one of seven districts in the Lake Toba Global Geopark area. This district has an area of 2,335.33 km², with the capital being Dolok Sanggul. According to Damanik et al. (2021), one of the attractions is an ecotourism object. The tourist attraction here that is most in demand by tourists is Sipinsur Geosite. Geosites are landforms that represent certain aspects of relief determined by morphogenetic processes and geological sublayers. Geosite is a landscape that is formed independently or in collaboration with other bioecological or anthropic elements so that it becomes an object of heritage. Geosites are the clearest representation of geomorphological processes of the relationships that exist between the various factors that cause them (Ilies and Josan, 2009). Currently, Sipinsur has been designated as one of the Toba Caldera Geosites, together with 15 other geosites in the Lake Toba area and its surroundings (Anele, 2021; Astuti, 2021). As stated by Ginting and Siregar (2018), the Muara geosite is a tourist attraction in the Lake Toba area. It also occurs in the Muara geosite. The tourism sector in this area has received maximum handling so that many tourists look to its natural potential. Sipinsur is also one of the geosites in the Toba Global Geopark area. At this location, tourists can see firsthand the wide and beautiful view of Lake Toba. The location of Sipinsur Tourism is on a hill in the highlands, so you can see many sides of the panorama of Lake Toba and Samosir Island. The area is about two hectares and is located at an altitude of 1,213 meters above sea level (Gov. Humbang Hasundutan, 2017).

So far, very little research has been done on the Sipinsur Nature Tourism object related to the potential and development of this tourism. This tourist object has never done a comprehensive analysis of the potential and feasibility of its development. Meanwhile, comprehensive information related to this needs to be taken into consideration by managers in developing this natural tourism object. Comprehensive data and information from the research results are also needed as introduction and promotion materials to potential visitors, both local and international. Therefore, research on feasibility analysis and aspects of ecotourism development in the Sipinsur Nature Tourism area is very necessary.

The purpose of this research is to examine the potential of tourism objects, to analyze the feasibility of developing tourist objects, and to analyze visitor ratings on aspects of travel satisfaction, aspects of service, and the condition of infrastructure, as well as aspects of visitor participation in conservation and the environment at the Sipinsur Geosite Natural Tourism Area Toba Caldera Global Geopark Indonesia.

MATERIALS AND METHODS

This research was conducted at the Sipinsur Nature Park in Pearung Village, Parangan District, Humbang Hasundutan Regency, North Sumatra Province, Indonesia.

1. Population and Sample

The population in this study is all visitors who come to Sipinsur Natural Tourism Objects in one year. Sampling in this study uses the accidental sampling method, where every visitor who comes to the research location can be used as an

accidental responder. The determination of the number of samples in this study was made using the Slovin formula (Sugiyono, 2011). The Slovin formula, according to Mtotywa et al. (2022), Setiawan et al. (2021), Ellen (2012), and Sugiyono (2017), is as follows:

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Notes: n = number of samples; N = total population; e = fault tolerance limit (0,1);

The total population of visitors to Sipincur Nature Tourism in this study was 8,344/month so using the percentage error tolerance limit of 10%. Therefore, the number of research samples required is 99.33, which is rounded up to 99 visitors.

2. Research variable

The variables analyzed in this study refer to the Guidelines for Analysis of Operational Areas for Natural Tourism Objects and Attractions (AOA-NTOA) of the Director General of Forest Protection and Nature Conservation, Ministry of Forestry, Republic of Indonesia. This analysis guideline is also used in similar studies such as in the mangrove area of Tanjung Bara Sangatta Beach (Karlina et al., 2010), Teroh-teroh Waterfall (Panjaitan et al., 2015), Oro-oro Ombo Tourism Village (Wirahayu et al., 2022), and Bogor (Rahayuningsih et al., 2016).

3. Data analysis technique

Data analysis was carried out using two methods, namely:

a. Descriptive analysis with qualitative and quantitative approaches the quantitative measuring instrument used in this study is a questionnaire distributed to respondents.

b. Assessment of the feasibility of developing natural tourism objects by the AOA-NTOA guidelines.

Weighting is carried out on each criterion according to the AOA-NTOA guidelines, namely:

a. The attractiveness criterion is given a 6 because it is the main factor for someone doing tourism activities.

b. Accessibility is given a weight of 5 because it is an important factor that supports tourists' carrying out tourism activities.

c. Accommodation and facilities/infrastructure are given a weight of 3 because they are supporting factors in tourism activities.

The total score for one Natural Tourism Objects and Attractions (NTOA) assessment criterion can be calculated by the following formula (Mukmin, 2022):

$$S = N \times B \quad (2)$$

Notes: S = score/value of a criterion; N = sum of values; B = value weight;

The value of the feasibility index of a tourist attraction is calculated by comparing the score obtained with the total score of a criterion (the maximum value of each score is 5). The results of the assessment are as follows:

$$(A \div B) \times 100 \% \quad (3)$$

Notes: A = Scor kriteria; B = Scor Total kriteria; According to Karsudi et al. (2010) after the comparison, the feasibility index score obtained in percent is categorized as follows:

- If the feasibility level is > 66.6% then it is declared feasible to be developed

- If the feasibility level is 33.3% - 66.6% then it is declared not feasible to be developed

- If the feasibility level is < 33.3%, it is declared not feasible to be developed.

RESULTS AND DISCUSSION

1. Ecotourism Potential in Tourist Areas Sipinsur

Nature Tourism development is essentially an effort to develop and utilize tourism objects and attractions. According to Nahuelhual (2013), Ecotourism potential is the variety of natural resources found in a certain place or area that can be developed and used as a tourist attraction. From the results of the study, it was found that the potential contained in the Sipinsur Nature Tourism area was the potential for the beauty of natural scenery, the cool microclimate, the potential flora, and fauna, as well as the potential camping and camping grounds. Regarding the potential of the Sipinsur area, Damanik et al. (2021) also reported the same thing. According to Purwoko et al. (2020), the impact of tourism on the economy can be both positive and negative. Ecotourism in many conservation areas tends to be an alternative conservation approach to improve livelihoods. The economic value of ecotourism is expected to increase public awareness of conservation efforts as well. These impacts can be divided into public income, employment opportunities, prices and tariffs, distribution of benefits, ownership, and control, development, and government revenues.



Figure 1. The potential for the beauty of natural scenery in the Sipinsur Nature Tourism area from various directions; a. View of Sibandang Island, b. view of the coastal landscape of Muara District, c. view of the other side of Lake Toba

1.1. Natural Scenery Has Potential Beauty

Natural beauty is the main attraction of tourism activities. According to Gurung and Seeland (2008), in a case study in the Himalayas, visitors who are attracted by the beauty of nature stay longer than those who come to experience the culture. The natural scenery available at Sipinsur Nature Tourism is very beautiful and is the biggest attraction to attract visitors. If you enter the area, visitors will be greeted with the coolness obtained from the pine trees that surround the natural tourist area. This area also provides a beautiful view of Lake Toba, which makes visitors feel an extraordinary beauty, which also makes visitors not bored come to this tourist attraction. The blue water of Lake Toba provides coolness and tranquility for visitors to relax.

The potential beauty of the natural scenery of the Sipincur area can be felt immediately after walking 50 m from the entrance of the area. From the beautiful view of Lake Toba seen from this area, we can see Samosir Regency. The district has Sibandang Village, which is located closest to the waters of Lake Toba. Visitors can enjoy the view from all directions. Visitors can not only enjoy the beautiful scenery of Lake Toba but also the hills, where visitors can see districts in hilly areas.

1.2. Potential Flora and Fauna

Sipincur nature tourism is dominated by pine trees (*Pinus merkussi*). The coolness obtained from this type of plant makes visitors spend longer vacation time at tourist attraction locations. The flora found in this nature tour is pine trees (*Pinus merkussi*), red shoot trees (*Syzygium oleana*), palms, and various types of flowers. While the types of fauna in the tourist attraction area are wild cats and eagles, The fauna in this area is classified as not getting too much attention from visitors because they come to this tourist area to enjoy the natural scenery.

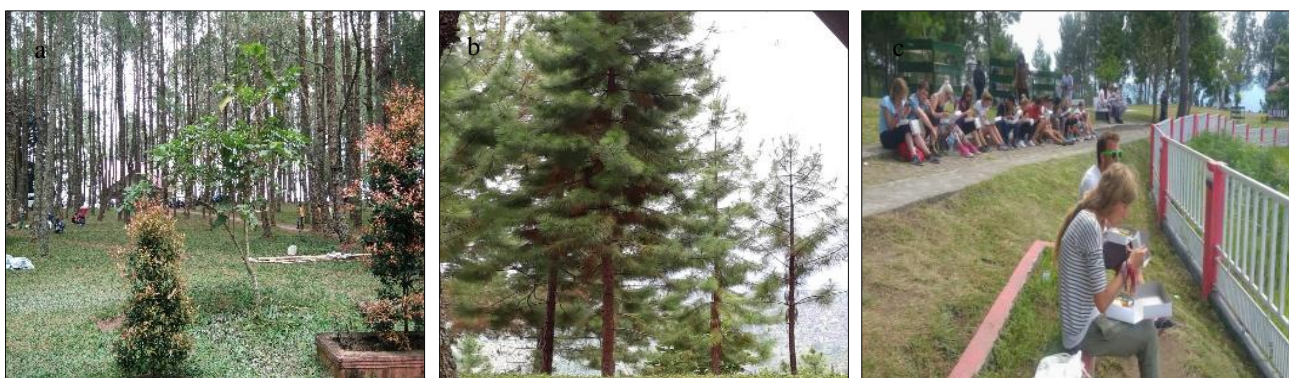


Figure 2. The potential of Flora and Fauna in Sipinsur Nature Tourism, a. Stands of Sumatran pine trees and exotic red shoots, b. Sumatran pine and red shoots which are endemic species, c. Visitor activities at Sipinsur Geosite

1.3. Potential Camping Area/Camping Ground

Camping ground facilities are an arena for camping for visitors who want to camp at this location for various activities, including research, organization, scouting, and enjoying the beautiful scenery at night at tourist attraction locations.



Figure 3. Potential camping area/camping ground; a. Camping ground, b. Playground under pine stands

Visitors who come to the Sipinsur Nature Tourism Area are not only local tourists but foreign tourists as well. Activities carried out in this area include not only enjoying the scenery, and the types of flora and fauna that exist, but camping as well. However, in this area, many activities have been realized, such as painting competitions, comparative studies conducted by Czech students, the Regional Festival (Gondang Sabangun Festival), and many other activities that visitors can do while enjoying the coolness and beautiful scenery. This activity must have received permission from the manager and the government.

2. Feasibility of Development of Sipinsur Natural Tourism Area

Aspects assessed from the Sipinsur Nature Tourism area include location attractiveness, accessibility, socio-economic environmental conditions, accommodation, supporting facilities and infrastructure, as well as the availability of clean water that supports the development of tourism objects.

2.1. Tourist Attractions

The attractiveness of a tourist location is the main reason for visitors to visit a tourist attraction location. The attraction of Sipinsur natural tourism is quite large to attract visitors. These attractions can be in the form of prominent natural resources such as flora and fauna, a variety of nature tourism activities, uniqueness of natural resources, cleanliness of the location, safety, and comfort of the tourist location. According to Sammeng (2001), attractiveness is a factor that makes people want to visit and see a place or object. A tourist attraction is anything interesting, unique, and of high value to tourists visiting a specific area. The analysis of this attraction is intended to describe the forms of recreational activities that can be developed according to the attractions and resources available in a location. Each of these attractions has its value, and this value shows how strong an attraction can attract the interest of its visitors. Each tourist attraction has its charm that characterizes nature tourism.



Figure 4. Various attractions in sipinsur nature tourism; a. Ethnic dance performances, b. Tourist information board

2.1.1. Uniqueness and outstanding natural resources

Based on the results of the study, the criterion for the uniqueness of natural resources obtained a value of 15, because in the area there are only elements of flora and fauna. Along this tourist trail, visitors can enjoy the coolness provided by pine trees that grow neatly, densely, and cleanly. The existing pine trees are decades old and naturally existed before being directly managed by the government. This view is one of the unique features of the Sipinsur Nature Tourism Object.

2.1.2. A wide range of natural-based tourism activities

Based on the results of the study, it was determined that the criterion for the variation of nature tourism activities got a value of 25. Within the area, five elements are included in the assessment. Natural tourism activities that can be done in this nature tourism are: enjoying the beauty of Lake Toba, which is different from other locations (e.g., Parapat), seeing flora (types of plants available at tourist attraction locations), camping, which is usually done by teenagers, school children, and others. scouting, education, research, and sports activities. Tracking activities also have the potential to become a sport that is carried out on this tour, but there is no indication or marker from the manager for the implementation and location of tracking.

2.1.3. The numerous natural resources that stand out

The criterion for the number of natural resources that stand out is getting a score of 15 because in the area there are 2 elements, namely elements of flora and water. Sipincur Nature Tourism has four flora types, namely pine (*P. merkusii*), red shoots (*Syzygium oleana*), palms, and paper flowers. However, the area around the tourist attraction is dominated by the type of flora pine.

2.1.4. Cleanliness of nature-tourist sites

Cleanliness is an important factor that needs to be considered by tourism object managers. The influence of cleanliness is also a factor that influences visitors' interest in enjoying tourist attractions. The location cleanliness criterion got a score of 20 because in the area five elements were included in the assessment. This natural tourism does not influence industry, busy roads, residential areas, vandalism, or other pollution. However, the awareness of visitors to maintain the cleanliness of the tourist attraction is still lacking because there is still garbage found around the tourist attraction that is not disposed of in the place provided.

2.1.5. Nature tourism safety and Comfort

Security is one of the important factors that visitors expect. Visitors to a tourist attraction will expect security and comfort that will keep them from becoming bored. The security criterion got a score of 30 because in the area five elements

were included in the assessment, while the comfort criterion got a score of 25 because in the area four elements were included in the assessment. This nature tourism is considered safe because there are no dangerous currents, no illegal logging, and encroachment, no theft, no disturbing beliefs, and it is free from dangerous diseases such as malaria. This nature tour is comfortable because it is free of disturbing odors; there is no disturbing public traffic; it is noise-free, and the air is cool. The only potential threat is the danger of landslides. However, this is relatively small because the side that has a relatively high slope is protected by the presence of pine trees that are still awake.

2.2. Accessibility

Tourism development will obtain optimal results if these development efforts are supported by the construction of facilities and infrastructure (Kanwal et al., 2020). In this case, one of them is accessibility. Accessibility is an important factor that needs to be considered to make it easier for visitors to travel from the visitor's residence to the location of the tourist attraction they will visit. Accessibility discusses the condition and distance of the road, the type of road, and the travel time required to travel from the city center to the location of the tourist attraction.

Based on the results of the study, it can be seen that the condition of the road is not too far from Doloksanggul to the tourist attraction, which is 9 km away. The access road for this tour is also paved. The time taken from downtown Doloksanggul to the tourist attraction area is 1-2 hours by land using public transportation or private vehicles. The total score obtained is 425. This value is obtained from the results of the assessment of each element or sub-element.

The criterion for road conditions and distances get a score of 25 because the road conditions are quite good and the distance from Doloksanggul is 9 km. The criterion for the type of road gets a value of 30 because the type of road while going to tourist sites is good. The criterion for travel time from the city center gets a value of 30 because the travel time that must be passed is only 1 hour. The factor that attracts visitors to come to the location of a tourist attraction is also its location close to other tourist attractions or close to the airport.

2.3. Socio-Economic Environmental Conditions

For tourism to contribute to sustainable development, it must be economically viable, ecologically sensitive, and culturally appropriate. Increments in understanding them can obscure basic problems and pose major challenges for regions (Sakellari and Skanavis, 2013). The condition of the socio-economic environment is also a factor that needs to be considered by tourism object managers. The strategic location of each facility and infrastructure must also attract the interest of the visitors and gets the value of 30. The land status of the Sipincur tourist attraction is state forest and gets a score of 30. The livelihoods of the population are mostly farm laborers, and most of them have graduated from junior high school and above and got a score of 25. In the assessment of environmental conditions, this economic factor can be said to be very good.

2.4. Accommodation

Accommodation in natural tourism activities is needed as a means when visitors want to stay at the location they visit. If there is no accommodation in a tourist location, accommodation can be provided at a location not far from the tourist attraction. This accommodation factor can also be considered for visitors who come from abroad to visit tourist sites. Based on the results of the study, it can be seen that the total score obtained is only 45 due to the absence of lodging places and only providing land for camping. This tourist attraction does not have other lodging places, so there are no rooms available. This can provide consideration for managers to provide more facilities to attract visitors.

2.5. Supporting Facilities and Infrastructure

Supporting facilities and infrastructure are one of the factors that help make it easier for visitors to enjoy tourist attractions, either directly or indirectly. The availability of this infrastructure is, of course, very helpful for tourists in communicating and even enjoying tourist visits; receiving treatment if they suddenly get sick; and having clean water for drinking. Likewise, the availability of facilities is very helpful in finding hygienic restaurants and public transportation, which makes it easier for visitors to come to tourist sites. Based on the results of the study, it can be seen that the criterion for facilities and infrastructure obtained a total score of 210. This result was obtained from the assessment of each element or sub-element which indicates the criterion for infrastructure received a score of 30 because in the area two elements are included in the assessment. The elements available in this tourist attraction are health centers and electricity networks. And the supporting facilities get a score of 40 because three elements are included in the assessment. The criterion is restaurants, shopping centers/markets, and souvenir shops. On this criterion, attention is still needed from the manager of the attraction because the facilities are still not provided for visitors.

2.6. Availability of Clean Water

Clean water is an important factor that needs to be provided by managers for visitors to increase their comfort in enjoying tourist attractions. Based on the results of the study, a total score of 840 was obtained. This result was obtained from the volume assessment, which obtained a total score of 840. This result was obtained from the volume assessment, which obtained a value of 25 because the volume of water available in the area is sufficient for use by visitors and managers. The assessment of the distance from the water source to the location of the object gets a value of 30 because the distance is not too far; it only covers a distance of 1 km. The assessment of whether or not water can flow to the object gets a value of 30 because it is very easy for water to flow to the location of a tourist attraction. The feasibility of consumption, which gets a score of 25, because all the water available in the area requires simple treatment, such as being cooked until it boils to maintain its hygiene and continuity, gets a score of 30 because of the availability of clean water throughout the year.

3. Assessment Results of NTOA

The aspects assessed in this study are the attractiveness of the tourist location, accessibility to be able to reach the location, accommodation around the tourist site, and also supporting facilities and infrastructure that support the development of tourist sites. The results of this assessment were obtained by making direct observations in the area. Based on the results of the assessment (Table 1.), it was found that the Sipinsur Nature Tourism area has the potential to be developed and is feasible. The results of the assessment of the Sipinsur Nature Tourism Area deserve to be developed as a tourist attraction with a presentation of 73.98%. The attractiveness of this area has a percentage of 72.22%, accessibility has a percentage of 70.83%, socio-economic environmental conditions of 95.83%, accommodation of 41.67%, and facilities and infrastructure have a percentage of 70%, and the availability of clean water is 93.33%.

The assessment of accommodation is not feasible because there is no accommodation available in the tourist attraction; only the camp area is available. However, accommodation is available around the location of the tourist attraction in the form of a homestay. In general, the results of the assessment of the Sipinsur Nature Tourism Area show that this area has great potential and is worthy of being developed into tourism.

Table 1. Results of assessment of Sipinsur Natural Tourism objects and attractions

Nu	Criterion	Weight (W)	Score (S)	Number of Scores (W*S)	Max Score (MS)	Dev. Feas. Index (%) (W*S)/MS	Development Feasibility Level
1	Attractiveness	6	130	780	1,080	72.22	Feasible
2	Accessibility	5	85	425	600	70.83	Feasible
3	Socio-economic environmental conditions	5	115	575	600	95.83	Feasible
4	Accommodation	3	25	75	180	41.67	Not Yet Feasible
5	Supporting facilities and infrastructure	3	70	210	300	70.00	Feasible
6	Availability of clean water	6	140	840	900	93.33	Feasible
	Overall					73.98	Feasible

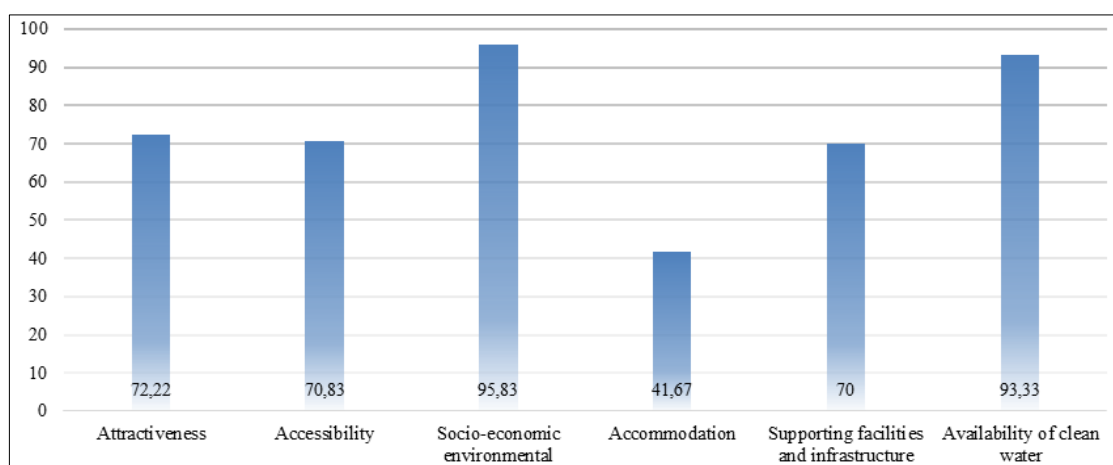


Figure 5. Various attractions in Sipinsur Natural Tourism

4. Sipinsur Nature Tourism Development

Based on the report by Paramitha et al. (2019), Ecotourism Sipinsur plays an important role in the formulation of regional development plans, policies, and coordination of regional development plans that can support and encourage the development of each ecotourism destination. Damanik et al. (2010) also concluded that the business development of the Sipinsur ecotourism area has a positive and significant effect on regional development in Humbang Hasundutan Regency.

4.1. Infrastructure Development

Facilities and infrastructure are two of the factors that influence the development of tourism management that supports the smoothness of tourist activities while at the location of a tourist attraction. This is to the statement of Vila et al. (2015), which states that the factors that influence the development of tourism management are: service factors, facilities and infrastructure factors, object factors and natural tourist attractions, and safety factors. The facilities and infrastructure in Sipinsur are adequate because this tourist object is owned and managed by the Humbanghasundutan Regency Tourism Office (Paramitha et al., 2019). However, it is reported that due to inadequate funding by the government and limited private sector participation, some tourist destinations in Lake Toba are not well maintained and maintained.

The Sipinsur geosite itself collapsed due to natural elements (such as rain) without any serious efforts to restore it. This has an impact on reducing the number of foreign tourists visiting these sites (Anele, 2021). The facilities and infrastructure that need to be developed are seats (benches), which are located close to scenic spots; adding lodging (accommodation); adding selfie photo spots; adding trash cans; an internet network for all operators; children's games; rides. It is nature that attracts foreign tourists, making souvenirs by hand and adding directions to the location of tourist attractions.

4.2. Development of Tourism Objects and Attractions

The increase in tourist attractions carried out by the managers will increase the attraction of visitors to tourist

attractions because the main factor that makes visitors come to tourist attractions is the potential and attractiveness of the area. This is to the statement of Devy and Soemanto (2017), which states that the attraction of tourist objects is one of the main capitals that must be owned in efforts to increase and develop tourist objects and attractions.

These developments include increasing the variety of plants that exist in tourist attractions and renewing attractions at certain times so that visitors don't get bored. The renewal of the tour can be done by adding rare tree species and giving instructions on the types of pine trees that are in the tourist attraction. It can also be done by tidying up the pine trees because many branches are rotten but still hanging on the pine trees.

4.3. Tourism Service Development

Service development needs to be done to improve the quality of tourist satisfaction after visiting tourist sites. Service can be an assessment for visitors to visit again. A good and appropriate feasibility index can be used as an effort to increase the development of tourism objects. A good and appropriate feasibility index can be used as an effort to improve the development of tourist attractions. As a comparison material, in North Sumatra Province there is also one of the natural attractions in the form of Terohteroh Waterfall which is tourism that has the potential of tourism objects and the feasibility level whose components are the same as Sipinsur Tourism (Panjaitan et. al., 2015).

The weakness of Sipinsur natural tourism lies in the attractiveness of tourist attractions, while the advantages are in accessibility, accommodation, facilities, and infrastructure. In both attractions, the accommodation criterion both have a low level of eligibility, which is not yet feasible. This can be a special concern for tourism object managers in developing the potential that exists in these attractions. Of the two, the overall feasibility level of Sipinsur natural tourism is greater than the natural tourism of Terohteroh Waterfall.

This natural tourism area requires a lot of development of ecotourism potential, starting with adding facilities, improving services, and attention from local governments. The community and the business society are also expected to participate in increasing the development of ecotourism potential from this natural tourism, starting from awareness of maintaining cleanliness and maintaining the preservation of flora in the Sipinsur natural tourism area.

5. Visitors' Rating of Sipinsur Nature Tourism

Visitors are parties who enjoy tourism services. Visitor assessment becomes an objective barometer to determine the quality of two natural tourism objects. This assessment method was also used by Göktuğ and Nihan (2015) in the Central Coast Region of Western Australia; Hodur et al. (2005) in the Great Plain; Willis (2009) in Hadrian's Roman Wall; and Naidoo et al. (2011) in Mauritius; Arabatzis and Grigoroudis (2010) in Dadia–Lefkimi–Soufli National Park; Herrera et al. (2018) stated that the assessments obtained based on the perspectives and opinions of managers and visitors can be used as a basis for participatory management of the sustainability of tourism destinations.

5.1. Travel Satisfaction Aspect

Visitor satisfaction is also a factor that needs to be considered as an evaluation tool for the development of natural tourism. One of the indicators assessed in travel satisfaction is the introduction of travel, type of tour group visit, frequency of visits, length of visit, and the main purpose of the tour.

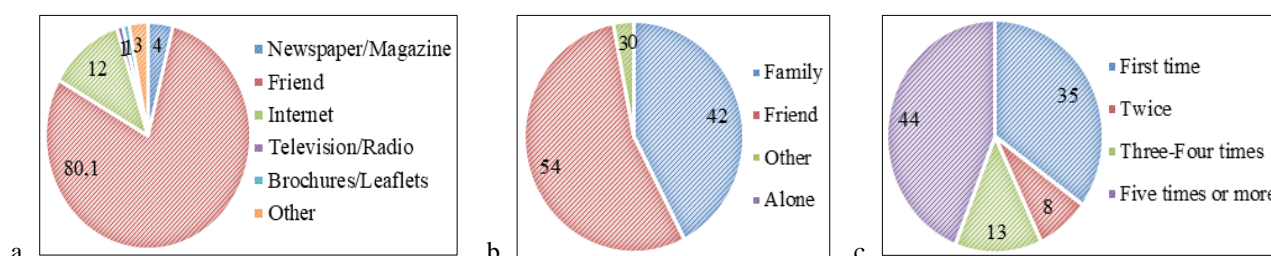


Figure 6. (a) Introduction to Sipinsur Natural Tourism (b) Type of visit of Sipinsur Natural Tourism group (c) Frequency of visits to Sipinsur Natural Tourism

Figure 6 (b) depicts a comparison of the types of tourist visits to Sipinsur Nature Tourism with friends or professional colleagues versus family or alone. Thus, 96% of visitors to Sipinsur Nature Tourism are visitors who come in groups. If in one group, the tourist destinations are met, then they can promote this tourist spot and come back with a new group. Based on Figure 6 (c), it can be seen that the highest frequency of visits by visitors to a site is five times or more, namely 44%, while the second time is 8%, three-four times 13%, and for the first time 35%. This is because visitors who often visit are the average community around the tourist attraction, whose location is not too far away, so they often spend their holidays on this natural tourism. The thing that dominates the second largest is those who visit for the first time. This is because many visitors from outside Humbang Hasundutan Regency are curious to visit these attractions.

Based on 7 (a) research, on average, visitors choose Sipinsur Nature Tourism as the main destination for traveling, as many as 78%, and those who choose not as much as 21%. That's because most of the visitors are people around the tourist area, and the location is not too far away. Based on Figure 6 (b), it can be seen that the length of the visit ranged from two to four hours, 34%, while 28% stated that it was between four and six hours and one to two hours.

As many as 16% of visitors even enjoy traveling activities for more than six hours. The length of tourist visits is related to the density of visitors in tourist attractions which disturbs the comfort of the visitors. At Sipinsur Nature Tourism, the

length of visit of visitors does not have a major impact on the comfort of the visitors. This is because visitors limit the time of their respective tourist visits without direction from the tour manager.

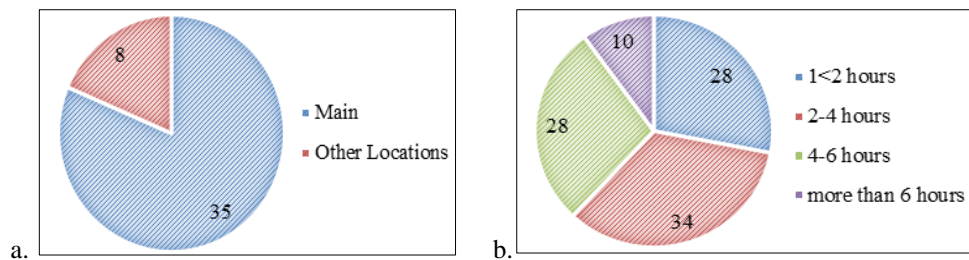


Figure 7. (a) Object urgency category for visitors (b) Duration of tourist visit

5.2. Services and Conditions of Sipinsur Nature Tourism Facilities and Infrastructure

The condition of services, facilities, and infrastructure owned by this tour can be used as evaluation material for managers in improving and increasing tourism potential to make it more developed. These services will give the impression of a traveling experience. The assessment from Figure 8 (a) of these services starts with tourist attractions, tourist activities, service officers, the conditions of facilities and infrastructure, and their management. The dominant visitors like the attraction components offered. This is because the tourist attraction components, such as having an attraction in the form of a pine forest (*Pinus merkusii*) and other components, give a good impression to the visitors.

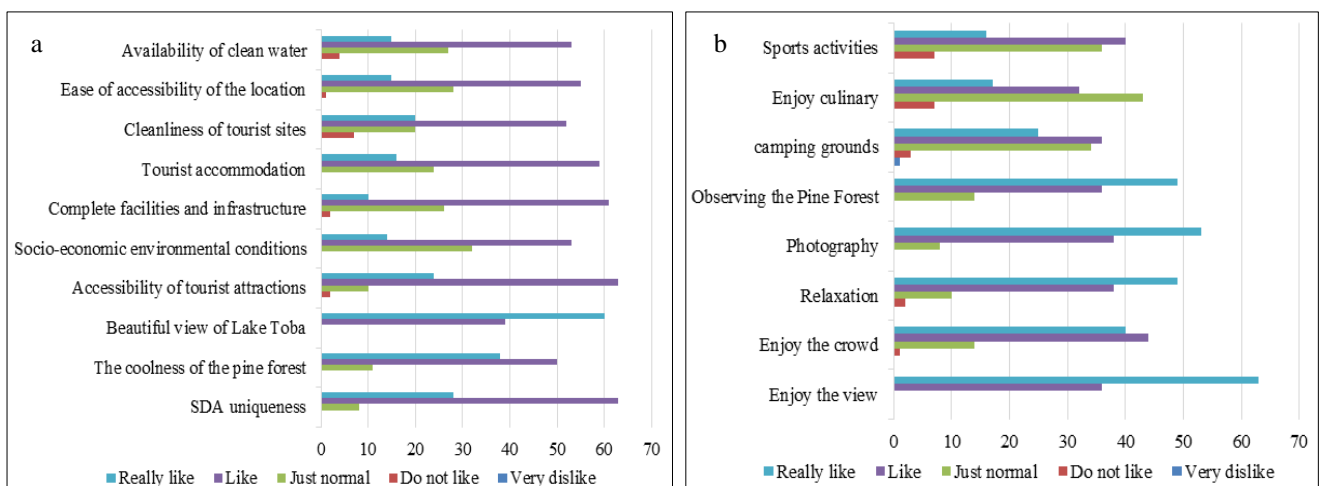


Figure 8. (a) Visitors' opinions about sipinsur's natural tourist attractions (b) Visitors' opinions about tourist activities

Judging from Figure 8 (b), it can be seen that almost most of the respondents like activities to enjoy the scenery, enjoy the crowds, relaxation, photography, observing the pine forest, camping grounds, and even sports activities. This is because, in addition to providing beautiful views, visitors also often take selfies at photo spots that have been provided in the tourist attraction area. However, in terms of enjoying the culinary delights of the visitors, it is normal because the cuisine provided is only local and traditional snacks that are usually consumed by visitors daily. The price of food is quite expensive, so it makes the visitors not enjoy the cuisine in the tourist attraction area. Tourist activities in this area need to be increased to increase their attractiveness and increase visitor awareness about nature conservation. By Maharani (2016), increasing awareness about nature conservation is in line with an increase in outdoor tourism activities.

From Figure 9 (a), it can be seen that the service provided by the manager to visitors is said to be good; only the souvenir shop component needs to be improved. This is because the souvenirs provided are not very attractive and do not follow trends. From Figure 9 (b), it can be seen that the condition of the facilities and infrastructure provided by the manager is adequate, and the components that need to be improved are the souvenir shop and the camping ground. This is because the facilities provided, such as tourist counters, tourist trail roads, bathrooms, conservation education themes, and the availability of trash cans, still meet the satisfaction of visitors.

The souvenir shop received an ordinary rating because the souvenir items were not unique and special, while the camping ground was not the center of activity for most of the visitors. Therefore, it is necessary to develop facilities and infrastructure to increase the attractiveness of tourism for the development of tourism. According to Nahuelhual (2013), the development of tourist attractions and tourist objects will achieve optimal results if these development efforts are supported by the construction of facilities and infrastructure. Based on Figure 9 (c), it can be seen that the opinion of visitors to the management of Sipinsur is said to be good. However, this is still a concern for the manager to continue to upgrade the convenience of service to visitors to attract visitors from outside the city and even abroad.

5.3. Aspects of Visitor Participation in Conservation and the Environment

In general, this participation statement shows that some of the visitors are people who care about conservation and

the environment, which is reflected in the form of a participatory attitude. According to Nugroho et al. (2018), one of the efforts to optimally utilize local resources is to develop tourism with the concept of ecotourism, which is carried out as an inseparable part of conservation efforts. Based on Figure 10 (a), respondents indicated their dislike for some behaviors that were considered disturbing. The use of single-use plastic wraps, glasses, and bottles is an example of behavior that is considered to be disturbing the comfort of traveling. The visitors also did not show high awareness of maintaining cleanliness. Even though there are garbage dumps available, visitors still throw garbage carelessly.

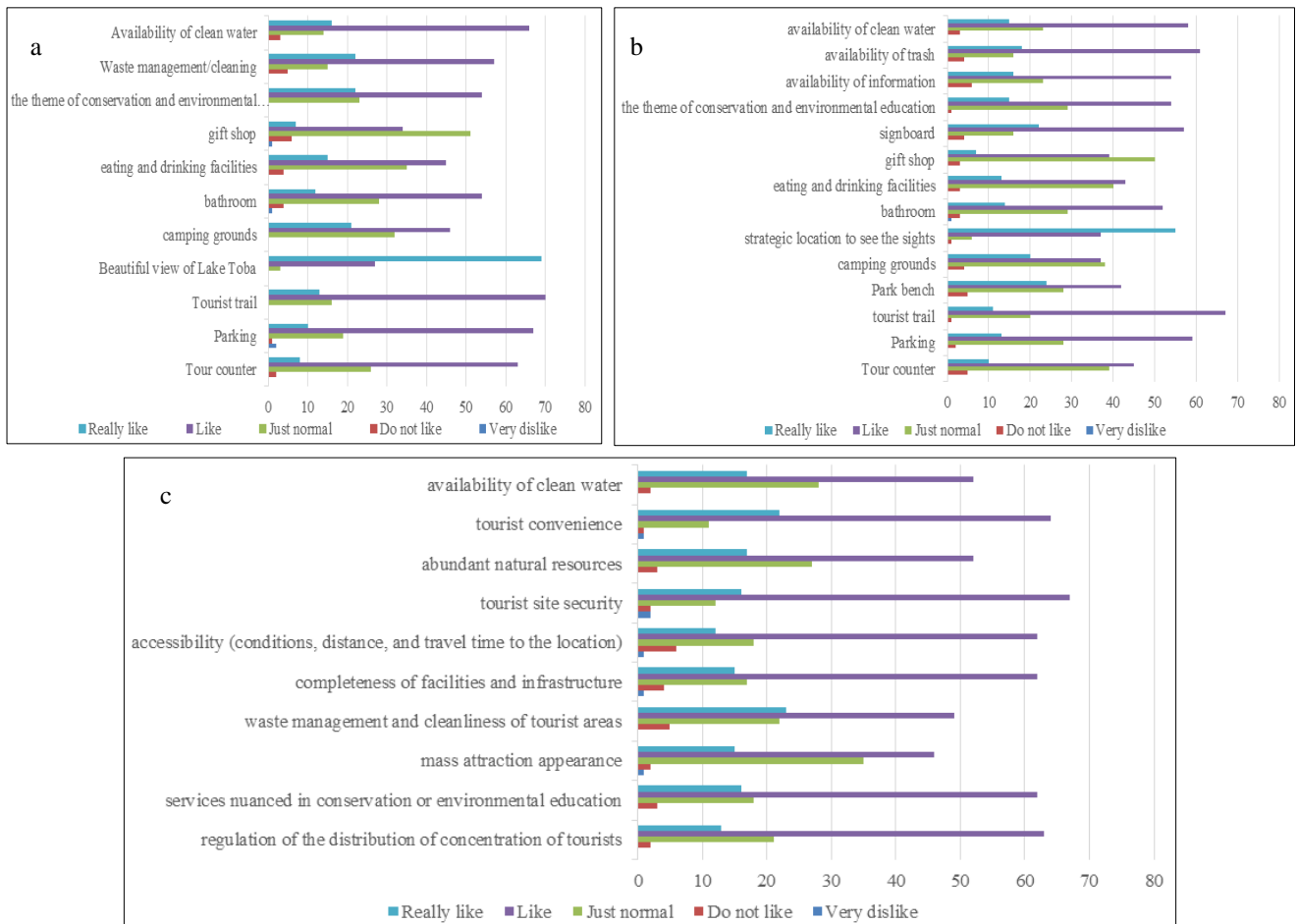


Figure 9. (a) Visitor's opinion about management service (b) Visitor's opinion about the condition of facilities and infrastructure (c) Visitors' opinions about tourism management

Based on Figure 10 (b), it can be seen the form of visitor participation can support conservation and the environment around the tourist attraction. It can be seen that most of the visitors are willing to take responsibility for overcoming conservation and environmental problems. This condition means that visitors like a clean and well-maintained environment. Directly, this is an indication that respondents and managers realize how important it is to maintain the natural tourism environment. This awareness needs to be developed as part of efforts to educate the public on the importance of beauty and comfort in the tourist environment.

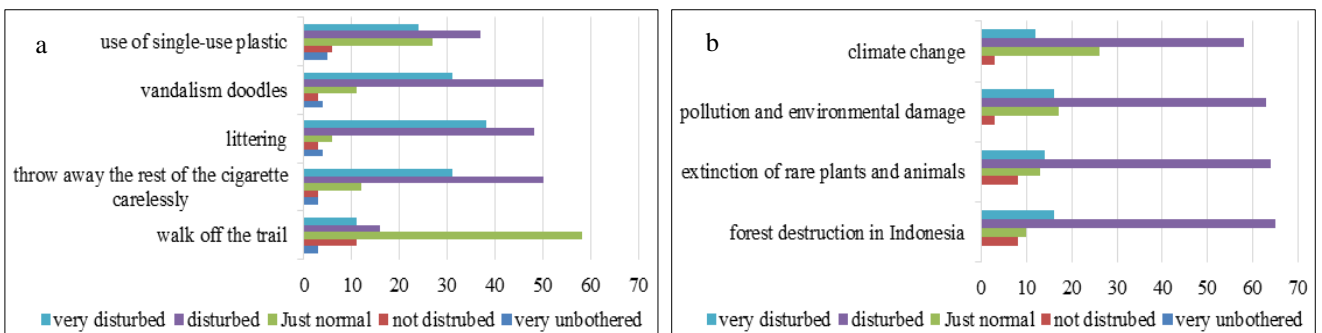


Figure 10. (a) Visitor responses to environmentally destructive behavior (b) Willingness of visitors to participate in conservation and environmental efforts

CONCLUSION

Sipinsur Nature Tourism has three potentials, namely the beauty of natural scenery with a cool mountain

microclimate, the diversity of various types of aesthetic flora, especially pine (*Pinus merkusii*), red shoots (*Syzygium oleana*), various palms, and flower plants, exotic fauna such as wild cats and eagles, and the potential for camping grounds as a center for tourist activities. The results of the development feasibility analysis for all aspects including the attractiveness of the tourist site, accessibility, socio-economic environmental conditions, accommodation, supporting facilities and infrastructure, and the availability of clean water, were declared feasible to be developed into a more developed tourist attraction with an overall feasibility index of 73.98%.

Visitor assessment of travel satisfaction aspects shows that the majority of visitors visit more than 1 time (65%). The majority of visitors (80.1%) get information about Sipinsur natural attractions from friends/relatives. The majority of visits were carried out in groups (96%), namely with groups of friends/professionals 56.56% and family (42.42%). As many as 78.78% of visitors make Sipinsur the main destination, with the most visit duration between 2-4 hours (34.34%). In the aspect of visitor assessment of the service and condition of facilities and infrastructure of tourism objects, the majority of visitors rate like/interested/good, some rate very like/very good/very interested, and only a few rate less good/less attractive on the overall assessment indicators. The majority of visitors also reject various irresponsible behaviors and actions and are willing to participate in Conservation and Environmental Efforts.

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REFERENCES

- Anele, K.K. (2021). An Assessment of Sustainable Tourism Development in North Sumatra. *Cesit* 2020, 207–218. <https://doi.org/10.5220/0010306202070218>
- Arabatzis, G., & Grigoroudis, E. (2010). Visitors' satisfaction, perceptions and gap analysis: The case of Dadia–Lefkimi–Soufli National Park. *Forest policy and economics*, 12(3), 163-172. <https://doi.org/10.1016/j.forpol.2009.09.008>
- Astuti, M.T. (2021). Strengthening the Tourism Promotion Strategy in Priority Destinations for Lake Toba. In *Proceeding The First International Conference on Government Education Management and Tourism* 1(1), 444-456, Chesner CA. 2012. The Toba Caldera Complex. *Quaternary International* 258, 5-18.
- Damanik, S.E., Rozalina, R., & Nurrachmania, M. (2021) Influence of Sipinsur Ecotourism Area Business Opportunity on Regional Development in Humbang Hasundutan Regency. *International Journal of Business, Economics and Management*, 4(1), 130-134. <https://doi.org/10.31295/ijbem.v4n1.1336>.
- Devy, H.A., & Soemanto, R.B. (2017). *Pengembangan obyek dan daya tarik wisata alam sebagai daerah tujuan wisata di Kabupaten Karanganyar*. *Jurnal sosiologi dilema*, 32(1), 34-44 (in Indonesian).
- Direktorat Jenderal Perlindungan Hutan dan Konservasi Alam. (2003). *Pedoman Analisis Daerah Operasi Objek dan Daya Tarik Wisata Alam* (ADO-ODTWA). Bogor (in Indonesian).
- Dowling, R., & Newsome, D. (2018) Geotourism: Definition, characteristics and international perspectives. In *Handbook of Geotourism*; Dowling, R., Newsome, D., Eds.; Edward Elgar: Cheltenham, UK, 2018, 1–22.
- Dowling, R.K., & Fennell, D.A. (2003). The context of ecotourism policy and planning. *Ecotourism policy and planning*, 1.
- Ellen, S. (2012). *Slovin's formula sampling techniques*. <https://sciencing.com/slovins-formula-sampling-techniques-5475547.html>.
- Gaspar, D., Shah, A., & Tankha, S. (2019). The framing of sustainable consumption and production in SDG 12. *Global Policy*, 10, 83-95. <https://doi.org/10.1111/1758-5899.12592>
- Ginting, N., & Siregar, N. (2018). Geotrail development to connect the dots in Muara Caldera Toba, Indonesia. In *IOP Conference Series: Earth and Environmental Science*, 126(1), 012169, IOP Publishing. <https://doi.org/10.1088/1755-1315/126/1/012169>
- Göktaş, T., & Nihan, A.R.P.A. (2015). *Ziyaretçi yönetimi bağlamında Ilgaz Dağı Milli Parkı'nda rekreasyon deneyim kalitesinin saptanması*. *Kastamonu University Journal of Forestry Faculty*, 15(1), 146-161 (in Türkiye). <https://doi.org/10.1007/s00267-002-2916-z>
- Gurung, D.B., & Seeland, K. (2008). Ecotourism in Bhutan: Extending its benefits to rural communities. *Annals of Tourism research*, 35(2), 489-508. <https://doi.org/10.1016/j.annals.2008.02.004>
- Herrera, M.R.G., Sasidharan, V., Hernández, J.A.A., & Herrera, L.D.A. (2018). Quality and Sustainability of Tourism Development in Copper Canyon, Mexico: Perceptions of Community Stakeholders and Visitors, *Tourism Management Perspectives*, Volume 27, Pages 91-103, ISSN 2211-9736, <https://doi.org/10.1016/j.tmp.2018.05.003>.
- Hodur, N.M., Leistritz, F.L., & Wolfe, K.L. (2005). Assessing the economic development potential of nature tourism. *Great Plains Research*, 279-296.
- Ilies, D.C., & Josan, N. (2009). Geosites-geomorphosites and relief. *GeoJournal of Tourism and Geosites*, 3(1), 78-86.
- Ilies, D.C., & Josan, N. (2008). Some theoretical aspects regarding the genesis of geosites. *GeoJournal of Tourism and Geosites*, 1, 7-12.

- Kanwal, S., Rasheed, M.I., Pitafi, A.H., Pitafi, A., & Ren, M. (2020). Road and transport infrastructure development and community support for tourism: The role of perceived benefits, and community satisfaction. *Tourism Management*, 77, 104014. <https://doi.org/10.1016/j.tourman.2019.104014>
- Karlina, Muntasib, E., & Bismark, M.H. (2010). Strategy of Mangrove Ecotourism Development at Tanjung Bara Beach Sangatta, Region of East Kutai, East Kalimantan Province. *IPB Scientific Repository*. IPB University.
- Karsudi, K., Soekmadi, R., & Kartodihardjo, H. (2010). *Strategi Pengembangan Ekowisata di Kabupaten Kepulauan Yapen Provinsi Papua*. *Jurnal Manajemen Hutan Tropika*, 16(3), 148-154 (in Indonesian).
- Maharani, P.R. (2016). *Designing A Booklet of Al-Munawar Village In Palembang* (Doctoral Dissertation, Politeknik Negeri Sriwijaya).
- Manalu, L., & Manik, Y. (2021). Characterization of Ecotourism Destinations in Toba Lake Area with the Tourism Area Life Cycle (TALC) Method and Sustainability Analysis. *IOP Conf. Ser.: Earth Environ. Sci.* 737 012017.
- Mtotywa, M.M., Moitse, M., & Seabi, M.A. (2022). South African citizens' self-assessed knowledge about the fourth industrial revolution. *African Journal of Science, Technology, Innovation and Development*, 14(6), 1476-1485.
- Mucivuna, V.C., Reynard, E., & Garcia, M.D.G.M. (2019). Geomorphosites assessment methods: comparative analysis and typology. *Geoheritage*, 11, 1799-1815. <https://doi.org/10.1007/s12371-019-00394-x>
- Mukmin, S. (2022). Beach Are Development Strategy as the Prime Tourism Area in Indonesia. *Beach Are Development Strategy as the Prime Tourism Area in Indonesia*, 13(2 (58)), 414-426.
- Nahuelhual, L., Carmona, A., Lozada, P., Jaramillo, A., & Aguayo, M. (2013). Mapping recreation and ecotourism as a cultural ecosystem service: An application at the local level in Southern Chile. *Applied geography*, 40, 71-82. <https://doi.org/10.1016/j.apgeog.2012.12.004>
- Nahuelhual, L., Carmona, A., Lozada, P., Jaramillo, A., & Aguayo, M. (2013). Mapping recreation and ecotourism as a cultural ecosystem service: An application at the local level in Southern Chile. *Applied geography*, 40, 71-82.
- Naidoo, P., & Sharpley, R. (2016). Local perceptions of the relative contributions of enclave tourism and agritourism to community well-being: The case of Mauritius. *Journal of Destination Marketing & Management*, 5(1), 16-25. <https://doi.org/10.1016/j.jdmm.2015.11.002>
- Nasution, I. (2019). Persepsi Publik Tentang Destinasi Pariwisata Danau Toba Sebagai Global Geopark Kaldera UNESCO. *Publikauma: Jurnal Administrasi Publik Universitas Medan Area*, 7(2), 88-102.
- Nugroho, I., Negara, P.D., & Yuniar, H.R. (2018). The planning and the development of the ecotourism and tourism village in Indonesia: a policy review. *Journal of Socioeconomics and Development*, 1(1), 43-51. <https://doi.org/10.31328/jsed.v1i1.532>
- Ólafsdóttir, R., Tverijonaite, E., & Geotourism, A. (2018). Systematic Literature Review. *Geosciences* 2018, 8, 234. <https://doi.org/10.3390/geosciences8070234>
- Panjaitan, U.I., Purwoko, A., & Hartini, K. S. (2015). Analisis of Potency and Strategy of Tourism Object Development of Waterfall of Teroh Teroh Desa Rumah Galuh Sub-District of Sei Bingai, Regency of Langkat, North Sumatera. *Skripsi, Program Studi Kehutanan, Fakultas Kehutanan, Universitas Sumatera Utara, Medan, 20155*.
- Panjaitan, U.I., Purwoko, A., & Hartini, K.S. (2015). *Analysis of Potency and Strategy of Tourism Object Development of Waterfall of Teroh Teroh Desa Rumah Galuh Sub-District of Sei Bingai, Regency of Langkat, North Sumatera*. *Skripsi, Program Studi Kehutanan, Fakultas Kehutanan, Universitas Sumatera Utara, Medan, 20155*.
- Paramitha, N., Manik, Y., & Halog, A. (2019). Identification, characterization and stakeholder analysis of eco-tourism destinations in Lake Toba Area. *International Journal of Tourism and Hospitality in Asia Pasific (IJTHAP)*, 2(1). <https://doi.org/10.32535/ijthap.v2i1.355>
- Purwoko, A., Patana, P., & Daulay, U.A. (2020). Integration of Conservation and Economic Development in Gunung Leuser National Park. *IOP Conference Series: Earth and Environmental Science*. 739 (2021) 012055. <https://doi.org/10.1088/1755-1315/739/1/012055>
- Pemerintah Kabupaten Humbang Hasundutan. (2017). *Rencana Induk Pembangunan Kepariwisata Kabupaten Humbang Hasundutan*. Dinas Pariwisata Kabupaten Humbang Hasundutan. Dolok Sanggul (in Indonesian).
- Rahayuningsih, T., Muntasib, E. H., & Prasetyo, L. B. (2016). Nature based tourism resources assessment using geographic information system (GIS): Case study in Bogor. *Procedia Environmental Sciences*, 33, 365-375. <https://doi.org/10.1016/j.proenv.2016.03.087>
- Sakellari, M., & Skanavis, C. (2013). Sustainable tourism development: environmental education as a tool to fill the gap between theory and practice. *International Journal of Environment and Sustainable Development*, 12(4), 313-323. <https://doi.org/10.1504/IJESD.2013.056316>
- Sammeng, A.M. (2001). *Tourism Horizon*. Balai Pustaka. Jakarta.
- Santangelo, N., & Valente, E. (2020). Geoheritage and geotourism resources. *Resources*, 9(7), 80. <https://doi.org/10.3390/resources9070080>
- Setiawan, J., Budiastuti, M. S., Gravitiyani, E., & Setyono, P. (2021). Business model canvas (BMC) approach for tourism management strategy of the top selfie kragilan, Mt. Merbabu National Park. *Geo Journal of Tourism and Geosites*, 35(2), 297-303. <https://doi.org/10.30892/gtg.35205-651>
- Sugiyono (2017). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.
- UNESCO. (2006). Guidelines and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network (GGN).
- Vila, T.D., Darcy, S., & González, E.A. (2015). Competing for the disability tourism market—a comparative exploration of the factors of accessible tourism competitiveness in Spain and Australia. *Tourism Management*, 47, 261-272. <https://doi.org/10.1016/j.tourman.2014.10.008>
- Vita, D.G., & Kyaw, K.S. (2016). Tourism Development and Growth. *Annals of Tourism Research*, 60(9), 23-26
- Willis, K.G. (2009). Assessing visitor preferences in the management of archaeological and heritage attractions: A case study of Hadrian's Roman Wall. *International Journal of Tourism Research*, 11(5), 487-505. <https://doi.org/10.1002/jtr.715>
- Wirahayu, Y. A., Utomo, D. H., & Handoyo, B. (2022). Developing a model of sustainable development goals (sdgs) at the agropolitan-based oro-oro ombo tourism village. *Geo Journal of Tourism and Geosites*, 42, 735-742. <https://doi.org/10.30892/gtg.422spl12-883>