Analysis Of Mount Rinjani National Park’s Carrying Capacity Using Sustainable Tourism Management Model

Devi Ayuni, Efraim Bavo Priyana

Abstract: tourism has been one of the fastest growing industries in the world in the past twenty years as seen in the contribution of this sector in 2016, which accounted for 10% of global GDP. The number of international tourists will hit 1.4 billion by 2020, and 1.8 billion by 2030. Of these numbers, 57% of tourists are expected to visit tourist destinations in countries where economy is growing and developing, like Indonesia. Sustainable development of this sector should be treated as one of the medium and long-term strategic priorities, considering the economic potential and social contribution it gives. One of them is the Mount Rinjani National Park area, which has been since early January 2018 recognized as a Global Geopark by UNESCO. For this reason, the tourism object Mount Rinjani National Park should be analyzed for its carrying capacity through a National Park management that takes sustainability into account. This study was done by direct observation of Mount Rinjani National Park and interviews by descriptive analysis method using SWOT matrix analysis. Determination of public policy strategies was analyzed by method of Analytical Hierarchy Process (AHP). The results of the study show that, ecologically, the following strategies can be applied in tourism development: limiting the number of visitors, conserving the biodiversity, and managing the area. And economically, the strategies to be applied include good service, safety & security, improvement of supporting facilities and infrastructure along the hiking trail, and tour promotion and marketing. From social aspect, this will, among others, empower local communities to increase their income and raise their care for conservation areas, training, publicizing, and community guidance, and development of local attractions or culture to encourage the development of the tourist destination Mount Rinjani National Park.

Key words: carrying capacity analysis, sustainable tourism, Capacity Using, Tourism management

1. INTRODUCTION

Tourism has been one of the fastest growing industries in the world in the past twenty years. This is reflected in the sector’s contribution in 2016, which accounted for 10% of global GDP. One out of eleven new jobs is in tourism sector. The export value of the products related to tourism industry has reached 15 trillion USD. This value makes the tourism’s share in the export of goods reaching 7% and 30% in services. The total number of international tourists in 2016 reached 1,235 billion, rising 46 million (+ 4%) compared to 2015 which was recorded at 1.189 billion. Such increased flow of international tourists, mostly goes to the Asia Pacific region, which is 8.4% or 303 million tourists, rising 24 million, and Africa 8.1%, which is higher than the world’s average increase of 4%, and when compared with increases in other regions such as Europe, which is 2% and the USA 4.3% and the Middle East - 4.1%. The number of international tourists is expected to increase to 1.4 billion in 2020, and to 1.8 billion in 2030. Of these, 57% of tourists are expected to visit tourist destinations in countries where economy are growing and developing, like Indonesia. Other data according to the World Economic Forum, Indonesia’s tourism ranking jumped up to 42 out of 141 countries in 2017, and tourism sector is projected to account for 15% of Gross Domestic Product (GDP), 280 trillion in foreign exchange, and absorb 13 million workers, making it a sector to be relied upon when building the economic strength. Since the inauguration of the Mandalika Special Economic Zone in 2017, tourism activities in West Nusa Tenggara Province in general and the island of Lombok in particular, have started to show signs of life. The potentials offered by Lombok Island are indeed reckoned complete for special interest tourists. This area offers a wide range of resources, from a variety of natural landscapes, mountains, national parks that offer a variety of biodiversities with its tropical rain forests, to the cultural potential and such very strong local customs. The West Nusa Tenggara Regional Government, through the Lombok Island Sustainable Tourism Master Plan (STMP) 2015-2019, recognizes the economic potential and social contribution of tourism sector and makes sustainable tourism development one of the medium and long-term strategic priorities. One of them is the Mount Rinjani National Park area which has been since early January 2018 recognized as a Global Geopark by UNESCO. According to Lenzien and Murray (2003), human life needs from the environment can be expressed in the area of the land needed to sustain human life. The area of the land to sustain human life is called ecological footprint. Carrying capacity is the ability of a place to sustain the life of living creatures optimally in a long period of time or the ability of the environment to give prosperous and sustainable life to organisms for a population inhabiting an area. Developing the Mount Rinjani National Park conservation area of course has an impact on the environment. As a conservation area, Mount Rinjani National Park should be developed in a manner that always considers indigenousness and environmental preservation. Ecosystem indigenousness and natural nuances are potentials that should always be maintained in the management of the area. Therefore, to anticipate this,

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carrying capacity of the tourism object Mount Rinjani National Park should be identified to ensure that sustainability is taken into account in the management of the National Park. This is true because it is very central, for the fact that it contains not only various ecosystems of endemic flora and fauna, but also the life and culture of the local communities, as well as a unique interaction between human and the nature. Thus, any damage to it would be a loss, not only to the local communities but also to the country. Based on the background stated above, this study analyzes how carrying capacity can be adopted as a model for sustainable tourism management of Mount Rinjani National Park.

2. LITERATURE REVIEW

A review on previous researches was performed, among others, on the research by Sustri (2009), which is entitled carrying capacity of nature-based tourism at the national park Togean archipelago of Central Sulawesi, and aimed to assess the carrying capacity of Togean National Park. The results show that the carrying capacity (CPC) value of Togean National Park was 5,704 visits per day, RCC was 5,501 persons per day and carrying capacity was 195 persons/ha/day. While Khair (2006) aimed his research, which is entitled physical carrying capacity of ecotourism objects at Sibolangit Nature Tourism Park (Deli), Serdang Regency, to take into account physical carrying capacity (PCC), real carrying capacity (RCC) and Effective Carrying Capacity (ECC).

The results show that the management capacity obtained was 63%, and finally, ECC site 1 reached 274,115 visits per year and ECC site 2 reached 931,755 visits per year, each of which are already above the visit value in 2005 (1,517 visits per year). A research by Budi Setiyono (2016), entitled strategies for managing the nature-based tourism Posong Temanggung using SWOT approach and AHP, was aimed to determine alternative strategies for a more sustainable management of Posong Nature-Based Tourism Objects. The results show that the alternative strategies for the management of Posong Nature-Based Tourism Objects hierarchically are 1) managing and expanding the area (0.185); 2) strengthening the institutional management of tourism (0.157); 3) providing intensive training and mentoring by relevant agencies (0.144); 4) maintaining good coordination and communication with local communities and related stakeholders (0.135); 5) implementing a better waste management (0.105); 6) getting the involvement of the locals in the preparation of tour packages (0.095); 7) building the locals’ understanding of tourism (0.074); 8) designating a specific place for sellers (0.069); and 9) limiting the number of visitors (0.035). Article 1 point 7 of the Indonesian Law No. 32 of 2009 on Environmental Protection and Management states environmental carrying capacity is the ability of the environment to sustain human life, other living things, and the balance between the two. Environmental capacity is the ability of the environment to absorb substances, energy, and/or other components that enter or are entered into it. The Minister of Environment Regulation No. 17 of 2009 on Guidelines for Determining Environmental Carrying Capacity in Regional Spatial Planning states environmental carrying capacity is determined by identifying the capacity of the natural environment and resources to sustain the activities of the people/residents who utilize the space for survival. The amount of that capacity in a place is influenced by the conditions and characteristics of the resources available throughout the space. Environmental and resource capacity becomes a defining factor in determining the appropriate use of space. The environmental carrying capacity in this guideline is determined on the basis of 3 (three) approaches: (1) Land capability for allocation of spatial utilization; (2) Comparison between the availability of and the need for land; and (3) Comparison between the availability of and the need for water. The results of this determination will serve as a reference in the preparation of regional spatial plans. Environmental carrying capacity of a nature-based tourism object is the ability of the tourism object to accommodate the number of tourists in a given area and unit of time (Soemarwoto, 2004). Tourism carrying capacity is also a biogeophysical, socio-economic and socio-cultural carrying capacity of a location or tourism site in supporting tourism activities without degrading the quality of the environment and the satisfaction of the tourists enjoying the location and tourist sites. Cifuentes (1992) has developed a calculation of the carrying capacity of a conservation area. Adopting this carrying capacity is recommendable in order to identify the number of tourists that can be received optimally/Effectively without causing damage to the conservation area. According to Soemarwoto (2004), biogeophysical factor of a nature-based tourist site determines whether an ecosystem is strong or weak towards the carrying capacity of nature-based tourism. A strong ecosystem has a high carrying capacity, i.e., able to receive a large number of tourists because it is not damaged quickly and can recover quickly, if damaged. Ecotourism is a conservation-based concept of tourism development. Mount Rinjani is a nature-based tourist destination located in a conserved National Park. With the concept of ecotourism, tourists are expected to enjoy the natural beauty of Mount Rinjani while at the same time striving to protect the environment by participating in conservation activities. Honey (1999) puts forth that ecotourism is travel to fragile, pristine, and usually protected areas that strives to be low impact and usually small scale. It helps educate visitors, provides funds for conservation, directly benefits the economic development and political empowerment of local communities, and fosters respect for different cultures and for human rights. In terms of location, ecotourism is nature based, involves the local communities in the management, and respects the local culture. The objects used for ecotourism activities should be maintained and preserved, and the management should provide socio-economic benefits to the local communities and can generate funds to maintain the object itself. In terms of tourism activities, ecotourism is a tour travel to nature-based places that demand preservation, and ecotourism travel serves as a means of educating natural and environmental conservation for managers, local communities and visitors. Basically, sustainable tourism is an implementation of the Brundtland Report, which is a basis for sustainable development where tourism is one of the industries that play a significant role in environmental conservation. This is so because tourism is a service industry that builds on natural or cultural attractions as a product, as Murphy and Price (2005) put it "Tourism's
interest in sustainable development is logical given that it is one industry that sells the environment, both physical and human, as its product”. But tourism as an industry has been heavily attached to the facts that can affect the continuity of environmental preservation which should be a significant issue the development of tourism itself. McKercher (Ritchie and Crouch, 2003) explains some of the following facts about tourism.

**Table 1**

<table>
<thead>
<tr>
<th>Some Fundamental Truth About Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. As an individual activity, tourism consumes resources, creates waste and has specific infrastructure needs</td>
</tr>
<tr>
<td>2. As a consumer of resources, it has the ability to overconsume resources</td>
</tr>
<tr>
<td>3. Tourism, as a resource-dependent industry, must compete for scarce resources to ensure its survival</td>
</tr>
<tr>
<td>4. Tourism is a private-sector-dominated industry, with investment decisions being based predominantly on profit maximization</td>
</tr>
<tr>
<td>5. Tourism is a multifaceted industry, and as such it is almost impossible to control</td>
</tr>
<tr>
<td>6. Tourists are consumers, not anthropologists</td>
</tr>
<tr>
<td>7. Tourism is entertainment</td>
</tr>
<tr>
<td>8. Unlike other industrial activities, tourism generates income by importing clients rather than exporting its product</td>
</tr>
</tbody>
</table>


Another definition of sustainable tourism is seen as a way to preserve the environment, which has now become a global issue. According to Woodley (1993), sustainable tourism in parks (and other areas) must be defined in terms of sustainable ecosystems. Sustainable tourism is tourism which develops as quickly as possible, taking into account current accommodation capacity, the local population, and the environment; Tourism that respects the environment and consequence does not aid its own disappearance. This is especially important in saturated areas; and Sustainable tourism is responsible for tourism (Ritchie, 2003). Compared to previous researches, this study was located at a National Park which has a wide range of area and within the World Conservation Area, holding the status of UNESCO Global Geopark and, as such the results of this study will ultimately be very useful to agencies and organizations in their decision making. Specificity of the location and type of this research makes it different from previous researches and will be a novelty aspect. Sustri (2009) aimed his research, which is entitled carrying capacity of nature-based tourism at the national park Togean archipelago of Central Sulawesi, to assess the carrying capacity of Togean National Park. The results show that the PCC value of Togean National Park was 5,704 visits per day, RCC was 5,501 persons per day and carrying capacity was 195 persons/ha/day. While Khair (2006) aimed his research, which is entitled physical carrying capacity of ecotourism objects at Sibolangit Nature Tourism Park (Deli), Serdang Regency, to take into account physical carrying capacity (PCC), real carrying capacity (RCC) and Effective Carrying Capacity (ECC). The results show that the management capacity obtained was 63%, and finally, ECC site 1 reached 274,115 visits per year and ECC site 2 reached 931,755 visits per year, each of which are already above the visit value in 2005 (1,517 visits per year). A study conducted by Scott (2011) in Western North America show that Rocky Mountain National Park represents a major resource for nature-based tourism. Climate change can affect park tourism in the Rocky Mountains region by focusing on both direct and indirect impacts of climate change on visits to Waterton Lake National Park (WLNP). A statistical model of monthly visits and climate was developed to examine the direct impact of climate change on visits. This model projected that annual visits would increase between 6% and 10% in the 2020s and between 10% and 36% in the 2050s. The purpose was also to explore how climate-induced environmental changes could also indirectly affect visits. The environmental change scenario for the 2020s and 2050s was found to have a minimal influence on visits, but the scenario of environmental change for the 2080s (under the conditions of the warmest climate change) was found to have a negative effect on visits, as 19% of respondents indicated they would not visit the park and 37% said they would visit the park less frequently. The contrasting result of the two analyzes for the long-term impact of climate change was a key finding. As shown in Figure 1, this research was conducted at Mount Rinjani National Park Area which examined the problem of carrying capacity management, which had not been optimal. The problems identified were solved using an ideal analysis of tourism carrying capacity management through physical and affective carrying capacity aspect approach. The data collected for this study was obtained through observation, interviews, and literature. Data was analyzed using SWOT analysis strategy, which analyzes both internal and external factors. The result of the SWOT analysis will help identify a model for implementing sustainable tourism at Mount Rinjani National Park.

![Figure 1. Research Framework](image-url)

**3. RESEARCH METHOD**
This study tries to provide an overview of the Geopark Rinjani area by looking at all of the features in it. The research location was in the area of Mount Rinjani National Park, which stretches between 5 regencies: North Lombok, Central Lombok, West Lombok, and East Lombok Regencies on the island of Lombok, West Nusa Tenggara Province. The research began in April until November 2018. The research object consisted of the North Lombok Natural Resources Conservation Agency, North Lombok Tourism Office, National Park Manager, and Indonesia Ecotourism Network (Indocon), an NGO which is engaged in the development of sustainable quality systems on ecotourism. In this study, primary data was obtained through direct observation of Mount Rinjani National Park and from interviews with respondents and documentation. Secondary data is a historical data structure regarding variables previously collected and gathered by other parties. Secondary data was obtained from various sources such as the internet, websites, public libraries, and educational institutions. In this study, secondary data was obtained from published books, official reports of companies, and official websites of organizations. The data obtained from this study was processed by method of carrying capacity management, as proposed by Cifuentes (1992) in Sayan and Atik (2011). This method has been recommended by IUCN as revealed by Sayan and Atik (2011) in an ecological journal, Turkey. The result of the data processed will be interpreted and analyzed using descriptive analysis method, i.e., by describing or elaborating the result obtained. In general, this research was conducted using descriptive analysis technique. In a descriptive analysis, sustainable tourism is explained in full. The result then may be tabulated in SWOT matrix based on the assessment of internal and external factors. Internal factor can be either the strength obtained from positive perception of judgment (like, very like; or expressions of similar connotation) to the providers of natural tourism facilities and services at Mount Rinjani National Park or the weaknesses obtained from negative perception of judgment (dislike, very dislike; or expressions of similar connotation). External factor is an opportunity which is obtained from a positive judgment of the understanding of conservation and the environment and the possibility of making a travel again. External factor can also be a threat/obstacle/challenge that receives negative judgment. The strategic issues identified in the SWOT matrix can be analyzed further through in-depth interviews with stakeholders. The analysis was done by method of decision making. One of the methods of analyzing the determination of public policy strategies is Analytical Hierarchy Process (AHP). AHP is basically designed to rationally capture people’s perception that is closely related to certain problems through procedures which are designed to achieve a preference scale among various alternative choices.

4. RESULT AND DISCUSSION

4.1 SWOT Analysis

Determination of the strategy for developing Sembalun Mountain Rinjani National Park hiking trail is based on the assessment of environmental aspects (biophysics) and descriptive description (social and economic) using SWOT analysis. SWOT is a way to identify various types of factors when formulating a strategy (Marimin, 2004). The values of internal factors (IFAS) and external factors (EFAS) are determined and weighted by selected experts through in-depth interviews with: (1) Head of Mount Rinjani National Park Office; (2) Chief of Sembalun Resort; (3) Chief of Senaru Resort. Ecotourism development strategy should be assessed according to strategic environmental conditions affecting it (Tuwo, 2011). Tuwo (2011) further states that strategic environmental conditions include IFAS and EFAS factors that affect ecotourism management.

4.1.1 Strength

Judging from biodiversity, the Sembalun climbing path of Mount Rinjani National Park is part of the Mount Rinjani National Park area which has more than one type of ecosystem, ranging from lowland rainforest, highland rainforest and savanna or upland rocks. The Mount Rinjani National Park area has a variety of flora, thus enriching the diversity of existing plant species. This can be an attraction of nature-based tourism objects. In addition to flora, the Mount Rinjani National Park area also has a wide variety of fauna. In terms of the environmental carrying capacity of ecotourism, in one year the climbing tour of the Sembalun line has an Effective Carrying Capacity (ECC) of 72,090 persons/year. Ratio of the number of visitors to the value of carrying capacity of ecotourism at the Sembalun hiking trail has not yet exceeded the maximum limit. Judging from the economic contribution, ecotourism activities at Mount Rinjani National Park have significantly contributed economically. In addition to contributing to the community, the existence of climbing tours at Mount Rinjani National Park also provides benefits to the State in the form of Non-Tax State Revenues. The existence of climbing tours at Mount Rinjani National Park can possibly be developed to drive the local economy.

4.1.2 Weaknesses

In terms of supporting facilities, visitors mostly complained about the condition of toilets and trash bins. Hiking trail cleanliness and toilet condition and trash cans are a problem and weakness in the development Mount Rinjani National Park climbing management. The steep physical structure with such class of land slope in the Sembalun hiking trail, the soil characteristic that is very prove to erosion, and high rainfall cause the Sembalun hiking trail to be vulnerable to landslides. Poor preparation of the “good service, safety & security” to visitors is due to limited number of at the entrance to the Sembalun hiking trail, as there were only 4 persons there. Based on the result of interviews with the Head of Sembalun Resort, the ideal number of officers to serve at the entrance to the Sembalun climb is 6 persons.

4.1.3 Opportunities

The opportunity for the development of the Sembalun Mountain Rinjani National Park trekking tour is very big, especially from related stakeholders such as support from the West Nusa Tenggara provincial government, both from the Regional Work Unit such as the Provincial Tourism Office, tourism actors in Sembalun and Surroundings, The West Nusa Tenggara Indonesian National Sports Committee and the West Nusa Tenggara Provincial Mining
Service through various programs, activities and events either locally, nationally or internationally to attract tourists visiting Mount Rinjani National Park. One program that really encourages the development of climbing tourism is Geopark program, which was initiated by the West Nusa Tenggara Provincial Mining Office. High level of acceptance by the communities of the visitors’ presence is the basic capital in the development of nature-based tourist attractions. This reflects the communities’ support of ecotourism activities in the area where they live.

4.1.4 Threats

Cleanliness issue on the hiking trail is one of the factors that can give the impression and experience to visitors - if cleanliness is maintained, visitors will tell this to their friends / relatives that the cleanliness at Mount Rinjani National Park is maintained. This condition was even responded Nil by respondents who stated cleanliness on the hiking trails and the condition of trash bins could be a problem and threat in the development of Mount Rinjani National Park climbing management. In addition to cleanliness, respondents also stated that toilet facilities at Mount Rinjani National Park were very inadequate and not clean.

4.2 Internal and External Factors

An in-depth interview with selected experts shows that IFAS and EFAS were linked to aspects of sustainable development. Efforts were made to synchronize by integrating and giving the same value of weight for sustainable development aspects consisting of economic, socio-cultural and environmental aspects (Keraf, 2010). The values of IFAS and EFAS factors are then analyzed in the IFAS and EFAS matrix as follows.

<table>
<thead>
<tr>
<th>No</th>
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<th>Rating</th>
<th>Score</th>
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<tbody>
<tr>
<td>1.</td>
<td>Ecosystems with a level of biodiversity that are currently on vegetation and moderate diversity in animals</td>
<td>0.13</td>
<td>4</td>
<td>0.52</td>
</tr>
<tr>
<td>2.</td>
<td>Effective Carrying Capacity</td>
<td>0.20</td>
<td>4</td>
<td>0.80</td>
</tr>
<tr>
<td>3.</td>
<td>Managed by contributing income to the country</td>
<td>0.07</td>
<td>3</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Based on IFAS matrix analysis, strength is found in effective carrying capacity, while weakness is in lack of preparation of the “good service, safety and security” services to visitors. This suggests that carrying capacity of the provincial government has been very good but there are still weaknesses including good services and visitor’s safety. For this reason, the Government needs to pay attention to visitor services and security as one of the Government’s supporting factors. Meanwhile, based on EFAS matrix, the supports given by provincial government, academics, and communities would be a very good opportunity. As waste management has not been carried out optimally, this area can be replete with trash, which is a threat that needs attention from the management of Mount Rinjani National Park. Strategic factors for the development of sustainable ecotourism with respect to the climbing of Sembalun line are further analyzed by SWOT analysis matrix. Strategic issues for the development of the Sembalun hiking trail Mount Rinjani National Park were formulated by the relevant key persons and derived from an assessment which was based on the influential strategic environmental conditions (Tuwo, 2011). Analyzing the strategic issues formulated by key persons is very important as a basis for the development planning of Mount Rinjani National Park climbing tour. The strategic issues generated from the formulation of SWOT analysis are as follows.

**Table 2**

**Matrix IFAS**

<table>
<thead>
<tr>
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<td>0.21</td>
</tr>
<tr>
<td>Jumlah</td>
<td></td>
<td></td>
<td></td>
<td>3.66</td>
</tr>
</tbody>
</table>

**Table 3**

**Matrix EFAS**

<table>
<thead>
<tr>
<th>No</th>
<th>Internal Factors</th>
<th>Point</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The condition of damaged and inadequate facilities for public facilities for example toilets and bins</td>
<td>0.51</td>
<td>3</td>
<td>1.32</td>
</tr>
<tr>
<td>2.</td>
<td>The lack of service “good service, safety and security” for visitors</td>
<td>0.33</td>
<td>4</td>
<td>0.81</td>
</tr>
<tr>
<td>Jumlah</td>
<td></td>
<td></td>
<td></td>
<td>3.66</td>
</tr>
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**SWOT Matrix**
Based on the SWOT Matrix above, strategic issues in the SWOT matrix can be explained as follows:

1. **S-O Strategy**: using strength (S) to make good use of opportunities (O) with alternative programs:
   a. Preparing an integrated management plan with stakeholders and the communities around the entrance to the Sembalun hiking trail.
   b. Carrying out biodiversity conservation activities as the main objective and get the involvement of the local communities.

2. **S-T Strategy**: using strength (S) to deal with threats (T) with alternative programs as follows:
   a. Designing and producing alternative forms or models of efficient toilets for use on hiking trails.
   b. Adding trash bins and adjusting the shape, model, and material to be provided on the climbing lane.

3. **W-O Strategy**: dealing with weaknesses (W) to make good use of opportunities (O) with alternative programs as follows:
   a. Adding & maintaining supporting facilities for climbing routes.
   b. Providing visitor services including service, safety & security excellence by empowering the community & promotion or marketing.

4. **W-T Strategy**: minimizing weakness (W) and avoiding threats (T) with alternative programs as follows:
   a. Providing toilets and bins that are suitable for hiking trails.
   b. Carrying out waste management using effective and modern technologies which can bring economic values.

Assessment using SWOT analysis allows managers to know more about the strengths, weaknesses, opportunities and threats and the development that must be carried out according to their priorities (Tuwo, 2011). Then strategic issues are formulated by stakeholders who are key persons in determining the priority of strategies to be taken to achieve goals through Analytical Hierarchy Process (AHP) (Tuwo, 2011).

### 4.3 SWOT Analytical Hierarchy Process (AHP)

To follow up the strategic issues and alternatives resulting from the SWOT analysis, formulation is then carried out through in-depth interviews with key persons from each stakeholder. The stakeholders’ key persons are the same representatives of academic, business, government and community elements as those who determined the strategic issues in the previous SWOT analysis. Strategic issues and alternatives are grouped into three aspects of sustainable ecotourism development, namely ecological, economic and social aspects. The alternative strategies formulated by the stakeholders are as follows:

1. **Alternative strategies for the development of Sembalun track climbing tour, from ecological aspect:**
   a. Limiting the number of visitors
   b. Conservation of biodiversity
   c. Management of zones

2. **Alternative strategies for the development of Sembalun track climbing tour, from economic aspects:**
   a. Good service, safety & security
   b. Improvement of supporting facilities and infrastructure on the hiking trail
   c. Tour promotion and marketing

3. **Alternative strategies for the development of Sembalun track climbing tour, from social aspects:**
   a. Local community empowerment to increase income and care for conservation areas
   b. Training, publicizing and community guidance
   c. Developing local attractions or culture in order to promote development of Mount Rinjani National Park tourism.

### 5. CONCLUSION

The Sembalun climbing path to Mount Rinjani National Park, based on the assessment of environmental aspects (biophysics) and descriptive explanation (social and economic) using SWOT analysis shows that the SO strategy uses strength (S) to make good use of opportunities (O) with alternative programs, among others, developing integrated management with stakeholders and the communities around the entrance to the Sembalun hiking trail, and carrying out biodiversity conservation activities as the main objective and getting the involvement of the local communities. ST strategy uses strength (S) to deal with threats (T) with alternative programs, among others, designing and making alternative forms / models of efficient toilets to be used on hiking trails and adding trash bins and adjusting the shape, model and material of the bins to be provided on hiking trails. W-O strategy deals with weaknesses (W) to make good use of opportunities (O) with alternative programs including adding and maintaining supporting facilities for climbing routes and providing visitor services including service, safety & security excellence by empowering communities & promotion or marketing. W-T strategy minimizes weakness (W) and avoids threats (T) with alternative programs including providing toilets and trash bins that are suitable for hiking trails and doing waste treatment with effective and modern technologies which can
bring economic values. A sustainable ecotourism development consists of ecological, economic, and social aspects. The alternative strategies for the development of Sembalun hiking trail, from ecological aspect are limiting the number of visitors, biodiversity conservation, and management of zones. Further, alternative strategy for the development of Sembalun track climbing tourism, from economic aspect are good service, safety & security, improvement of supporting facilities and infrastructure on the hiking trail, and tour promotion and marketing. Alternative strategies for the development of Sembalun track climbing tourism, from social aspect include local community empowerment to increase income and care for conservation areas, training, publicizing and community guidance, and developing local attractions or culture to encourage the development of Mount Rinjani National Park tourism. Hopefully, there will be a policy analysis in the future for Sembalun and Senaru gates, in relation to the technical implementation, the waste management, rules to be observed by tour operators and tourists regarding climbing rules, publicizing the result of the analysis to tour operators and online management of visitor’s registration.

6 REFERENCES


