

Potential and Strategy of Ecotourism Management in the Lore Lindu National Park (Case study in Sigi Regency, Central Sulawesi Province, Indonesia)

Mohamad Agus Rahmat¹, Syukur Umar², Wardah², Muhd. Nur Sangadji²

1. Corresponding author Pascasarjana Programme, Tadulako University, Jl. SoekarnoHatta Km.9 Palu, Central Sulawesi
2. Supervisors Pascasarjana Programme, Tadulako University, Jl. SoekarnoHatta Km.9 Palu, Central Sulawesi

* E-mail of the corresponding author: agusrahmat6975@gmail.com

Abstract

The Lore Lindu National Park has high potential of natural resources such as endemic flora and fauna as well as cultural heritage which is suitable for tourism industry. However, some problems including lack of facilities, the increase in population, lack of awareness and poverty have hampered the prospect of tourism in the Park. The purpose of this research are to analyze ecotourism potency in the Lore Lindu National Park (TNLL) including villages surrounding the park, to analyze local communities opinion on ecotourism, to determine position of ecotourism in the SWOT diagram and to formulate strategy for ecotourism development. Data collected by primary and secondary survey. The analysis used are: Potential analysis and object of tourist attraction (ODTW) which consists of tourism attraction, accessibility, economy and social environment, accommodation, supporting facilities, and water availability, perception analysis and Strength-Weakness-Opportunity-Threat (SWOT) analysis. Based on the assessment of tourism potential and object of tourism attraction (ODTW), shows that the TNLL, has high potency of natural resources for ecotourism destination such as tropical forest where endemic flora and fauna could be found. Beside that other natural attractions are also available including caves, waterfalls, springs, Lindu Lake, and megalith stones. Local culture near the Park is also well maintained. The analysis also shows that six villages (Toro, Anca, Pakuli, Kamarora A, Karunia and Tuva) are appropriate to become ecotourism site. Pakuli village has the highest score of ODTW. Furthermore, based on accumulative analysis all research sites are categorized appropriate. Likewise, perception of respondents in all villages also supports ecotourism program in their region. Based on SWOT analysis suggests ecotourism program is located in quadrant I, which means that ecotourism has high prospect to be applied in the TNLL. Nevertheless, the park is facing several problems such as limited accessibility and facilities, low level of education, poverty and also the increase in population surrounding the park. Based on IFAS and EFAS analysis it shows that ecotourism in the TNLL is located in quadrant 1, which means that ecotourism has strengths and opportunities to be developed. Furthermore, strategy given is SO.

Key words: Ecotourism, potential, perception and strategy, Lore Lindu National Park

1. Introduction

Indonesia as one of the developing countries continues to reform in order to reap money from tourists, especially foreign tourists to enjoy the natural beauty and culture in this country. Based on the statistical data, the cumulative number of tourist arrivals come to Indonesia in the first half as much as 4.15 million visits, 7.18% higher than the same period of 2012. The Ministry of Tourism and Creative has set a target of a visit to the optimistic target of 8.9 million tourists in 2013 (Pratama, 2015).

According to the Tourism Minister, in 2019 the tourism sector is predicted to be the largest foreign exchange earner in Indonesia. The reason is that prices in the sector of natural resources such as oil, gas and coal, would decrease, so that the tourism sector could be the source of the largest recipient of foreign exchange. Tourism, in addition to improving people's income and foreign exchange sector, is also the employer of the latest one.

However, a surge in the number of tourists who visit the high intensity that it was not only a positive impact but also negative effects such as disruption of the environment, the degradation of culture, the emergence of social problems like alcoholism, gambling, prostitution and so on.. Tourism implicates this negative then referred to as a conventional mass tourism.

Recognizing this, and in line with the increasing widespread of voluntary movement of the global environment, the environmental experts and tourism then agreed to seek the form of a new tourism which can not only be economically profitable for a tourist destination, but also can safeguard the environment and maintain and respect the culture local community. One of the alternative forms of tourism that are considered to bridge the

problem is ecotourism.

The concept of ecotourism is closely associated with the environmental movement. One of the places that are considered strategic for the development of ecotourism is in the areas of conservation. Lore Lindu National Park (TNLL) is one of the conservation area in District of Sigi. This place was declared in 1978 as a Man and Biosphere Reserve and was officially designated as a National Park on October 5, 1993. The size of Lore Lindu National Park based on decree of Menhutbun No. 464 / Kpts-II / 1999 dated June 23, 1999 was 217,991.18 hectares. This park is one of the most important locations for Sulawesi biological protection as there are diversified habitats and untouched species of flora and fauna due to the fact that the place was isolated for 20-40 million years. This can, therefore, be an extraordinary ecotourism asset (Balai Besar Taman Nasional Lore Lindu, 2015).

However, over time the human population increases, the problems started relating to the environment in TNLL such as land-use conflicts, illegal timber (illegal logging), hunting of wild animals, high number of poor people living in TNLL surrounding area that create social problems.

Various efforts have been made by the government, especially through BTNLL to continue to preserve the TNLL. However, efforts made in particular of preventive measures such as policing and arrest perpetrators of encroachment are considered to not solve the root of the problems. The fundamental problem is the problem of poverty. Based on Presidential Decree No. 131 years 2015 on Stipulation of Disadvantaged regions, Sigi, a regency in Central Sulawesi province, was declared as underdeveloped areas. Furthermore, the data obtained from Bappeda Sigi illustrates that the villages located in the vicinity of TNLL were categorized as poor villages.

Similarly, there is still a perception from the people that TNLL region have limited their access to meet their basic needs. It begins when the process of determining the boundary. People said that the markers just put the boundary markers based on ability of personnel. According to the people this has resulted in many community plantation area that fall into the park area (Statistik of Balai Besar Lore Lindu National Park, 2015). Likewise, head of Sigi Regency also confirmed that conservation areas should ideally not afflict people who are living near the park because they have been dependent with forest resources around them since long time ago.

One way to bridge between conservation in the TNLL and the people who live around it is through ecotourism program. As one of the new forms of tourism, ecotourism is expected to serve as an alternative tool to empower local communities economically as well as to reduce pressure on ecosystems in the region of TNLL.

This study will elaborate the potential of ecotourism in TNLL, to obtain perception of the community living around the area TNLL in the district of Sigi, and also determine position of ecotourism in SWOT diagram and develop ecotourism management strategies so that it could preserve the existing of natural resources in the region and also improve people's welfare who lives surrounding the TNLL area.

3. Research Methodology

3.1 Time and Research Sites

The study was conducted for six (6) months. Research sites were divided into three zones. The first zone is in the western part of the TNLL including Toro Sub district of Kulawi Sub district, Tuva and Pakuli Sub district of Gumbasa. While in the eastern part of the park consists of Karunia Sub district of Palolo, Kadidia dan Kamarora A Sub district of Nokilalaki. One village, i.e Anca represent an area of Lindu Lake enclave.

Reason of selecting those research sites are as follows. Toro village is selected due to this village is known for its local wisdom in community activities, including natural resources management. Furthermore, Anca village representing an enclave area of Lindu Lake beside it is also categorized as a Fast Growing Strategic Area in District Sigi. The village Tuwa Saluki hamlet District of Gumbasa known as a breeding bird best Maleo nasional, while Pakuli Village District of Gumbasa known local knowledge about traditionally medicinal garden gift. Palolo village, a village known as three way junction of Lindu, where there is a road leading to lake Lindu. The last two villages located in the eastern part of TNLL is Kamarora village and Sub district Nokilalaki Kadidia Village is one of the entrances to the Lore Lindu National Park. there are hot springs and an observation area primates tarsius. The six villages expected to represent the Lore Lindu National Park, particularly in Sigi, directly adjacent to the Lore Lindu National Park which is culturally and naturally potential for ecotourism destination.

3.2 Types of Research

This research uses both quantitative and descriptively qualitative method. The population in this study is the

people who live around the TNLL. Data were gathered through purposive sampling method to classify the samples. Based on purpose explanation above, the population in this study is the population in the surrounding park areas of Lore Lindu spread across seven villages.

Likewise sample is a fraction of the number and characteristics possessed by the population. Purposive sample was determined by the method with approximately 10% to 15% of the people who have correlation with travel services. Respondents consisted of local communities such as community leaders, traditional leaders, village governments, youth leaders, women leaders, farmers, fishermen, teachers, bussinismen and tourists. Sample was also a respondent selected by gender and place of stay in the village (representing sub village) for the purpose of obtaining optimal representation.

Determination of sample number is based on Solvin's formula as follows (Sugiono, 2013):

$$n = \frac{N}{Nd2 + 1}$$

Where:

n = Number of Samples

N = KK

d= error rate of 10% and 90% confidence.

Based on the formula, 524 respondents were taken which consists of Toro 84, Tuva 81, Pakuli 84, Anca 60, Karunia 77, Kadidia 55 and Kamarora A 81.

3.5. Data analysis method

3.5.1. Ecotourism potential

ODTWA Analysis

Ecotourism potential of a region can be judged on the strength of the object. Object of region and natural attractions were analyzed according to the criteria in the Guidelines scoring Regional Operations Analysis Objects and Nature Attraction (ADO-ODTWA) Directorate General of Nature Conservation in 2003 which consists of six criteria including natural attractions, accessibility, social and economic environment, accommodation, supporting facilities, and clean water availability. Assigning weights to each criterion according to the guidelines ADO-ODTWA PHKA -2003 is different. Attraction is the main asset that allows the arrival of visitors because of the appeal by 6. Accessibility criteria were weighted 5 as an important factor supporting the rating for tourism activities. Furthermore, conditions of social and economic environment were weighted 5. Next, accommodation and facilities are weighted 3 as a supporting factor in tourism activities. Infrastructure and supporting facilities were weighted 3, and availability of clean water is weighted 6.

Score / value to the assessment criteria ODTWA can be calculated by the formula:

$$S = N \times B$$

Where S = score / value criterion,

N = the number of elements in the value criteria, and

B = weight value.

According to Karsudi dkk., (2010) that in order to achieve a reliability index value, the following formula must be applied:

$$\text{Reliability Index Value} = \frac{\text{Criteria score}}{\text{Total criteria Score}} \times 100\%$$

- Reliability rate > 66,6% = reliable to be developed as ecotourism destination
- Reliability rate 33,3%-66,6% = almost reliable (not reliable yet)
- Reliability rate <33,3% = unreliable

Public Perception Analysis

Local inhabitant's opinion was gathered through questionnaires. Data obtained were analyzed using Likert Analysis. While data from other key informants such as Head of Provincial Tourism Department, Head of regency, Head of House of Representative, head of sub districts, head of villages, and other key stakeholders in the study sites were collected through depth interview and focus group discussion.

SWOT analysis

Data are considered in accordance with the issue subsequently included in the table (tabulate) and then be discussed and analyzed qualitatively by using SWOT analysis is analysis of the strengths, weaknesses, opportunities and threats of an area by combining the data from fieldwork to data from research literature to get a conclusion.

The data obtained and do weighting. Weight rated from 1 (very important) to 0 (not important) . Weight of each strategic factor must sum to 1. The rating for the power and opportunity given the scale ranging from 4 (very good) , 3 (good), 2 (not good), and 1 (very bad) based on the influence of these factors. Rating threats and vulnerabilities rated -4 up to -1 (Rangkuti, 2016).

Findings and Discussion

a. Ecotourism Potential

Table 1. Cumulative Result of ODTWA Analysis

NO	CRITERIA	WEIGHT	MAXIMUM SCORE	SCORE (VALUE X WEIGHT)						
				Toro	Anca	Pakuli	Kadidia	Kamarora A	Karunia	Tuva
1	TOURISM ATTRACTIONS	6	1260	1260	1200	1200	930	1050	1140	1230
2	ACCESSIBILITY	5	1200	275	200	400	225	250	375	400
3	SOCIAL AND ECONOMIC ENVIRON	5	600	500	500	475	500	500	500	500
4	ACCOMMODATION	3	180	60	60	60	60	60	60	60
5	SUPPORTING FACILITIES	3	300	210	180	270	180	240	210	210
6	CLEAN WATER SUPPLY	6	900	870	870	870	570	870	870	870
TOTAL			4440	3175	3010	3275	2465	2970	3155	3270
Eligibility Index				71.509	67.793	73.761	55.518	66.892	71.059	73.649
Scoring				E	E	E	NE	E	E	E
Means of Eligibility Index				68.60						
Means of Eligibility Scoring				Eligible						

Note: E = Eligible
NE = Not Eligible

Table ODTWA above explains that of seven villages, only six villages are categorized eligible to be developed as ecotourism destinations. The villages are Toro, Anca, Pakuli, Kamarora A, Karunia and Tuva. While one village, Kadidia, is not eligible. The table also shows that Pakuli has highest score of eligibility index value (73,761) and followed respectively by Tuva (73,649), Toro (71,509), Karunia (71,059), Anca (67,793), Kamarora A (66,892) and Kadidia (55,518). However, based on average score of eligibility index value (68,60) all villages are categorized “**eligible**” to become ecotourism destination.

Based on criteria, Toro has a highest score in terms of attraction (1260) and followed respectively by Tuva (1230), Anca (1200), Pakuli (1200), Karunia (1140), Kamarora A (1050) and Kadidia (930). Furthermore, Pakuli and Tuva got highest score in terms of accessibility (400) and followed respectively by Karunia (375), Toro (275), Kamarora A (250), Kadidia (225) and Anca (200). Pakuli and Tuva have the highest score in terms of accessibility due to these two villages’ locations are the closest from Palu the capital of Central Sulawesi. In other words, Pakuli and Tuva are the closest villages from Palu compared to other study sites. In terms of accommodation all villages got same score (60). The reason is that all villages only have very limited, rudimentary and not well maintained accommodation facilities. In terms of supporting facilities, Pakuli has highest score (270), followed by Kamarora A (240), Toro (210), Karunia (210) and Tuva (210), Kadidia (160) and Anca (160). Pakuli and Kamarora A has the same score in terms of facilities as both villages are located in capital of sub district. Based on the clean water supply all villages have the same score (870), except Kadidia has only got 540. All villages have sufficient source of clean water, while Kadidia has only one source of water; i.e. spring for consumption and for agriculture needs.

b. Local Community’s Perception

Result of perception cumulative towards ten questions about ecotourism in all villages as study sites is presented in table 2.

Table 2. Cumulative of community's perception toward ecotourism development in study sites

NO	LIKERT ANALYSIS								Commulative
		Toro	Anca	Pakuli	Kadidia	Kamarora A	Karunia	Tuva	
1	NUMBER OF RESPONDENT	84	60	84	55	81	77	81	522
2	MAXIMUM SCORE	420	300	420	275	405	385	405	373
3	TOTAL SCORE	383	264	393	220	336	336	375	329
4	LIKERT INDEX	91.19	87.83	93.52	79.85	82.99	87.25	92.64	88.36
5	CATEGORY	Strongly agree	Strongly agree	Strongly agree	Agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree

Table 2 shows that result of perception analysis about ecotourism in all study sites on 522 respondents obtained an average Likert Index 88,63 and consequently it is categorized **“strongly agree”**. This result also indicates that all respondents support ecotourism program in their region. According to Fandeli (2005) that local people participation is very important as it provides opportunity for local community to involve in the process of decision making and in receiving benefit from ecotourism industry. Conversely, if local people are not participating it will create conflict and will decrease the quality of ecotourism. With regard to local community involvement, some experts explain that ecotourism can mean many things to the local people who live within or near the border of tourism destinations. For ecotourism to work effectively, local people must be partners in the process and derive genuine economic benefits (Colvin, 1994; Wall, 1997, Jacoby *et al.*, 1997, and Muller, 1994).

SWOT Anaysis

Internal Factors Analisis Summary (IFAS)

Strenghts

1. Natural Resources

The role of endangered species in attracting visitors in ecotourism is acknowledged by some experts including Sharp (1992), Campbell (1995) and Vickerman as cited in Orams (1998). According to Pitopang, *et al.*, (2014) several endemic flora could be found in the Lore Lindu National Park particularly in Sigi Regency such as *Pigafetta elata*, *Magnolia vrieseana* (Miq.) Baill.ex Pierce, *Bischofia javanica* Blume, *Arenga pinnata* (Wurm) Merr., *Ficus minahassae* (Teys.& de Vriese) Miq., *Dracontomelon dao* (Blanco) Merr. & Rolfe, *Alstonia scholaris* (L.) R.Br, *Cymbidium finlaysoniaunim* Lindl., *Calamus minahassae* Warb., *Calamus koordersianus* Becc., *Calanthe triplicate* (Willem.). Likewise, several endemic fauna are also reported in this park, including *Bubalus depressicornis* H. Smith, *Bubalus quarlesi* Quwens, *Sus celebensis* Muller and Schlegel, *Ailurops ursinus* Temminck, *Macrogalida muschenbroekil* Schlegel, *Tarsius dentatus*, *Cacatua sulphurea* Gmelin, *Rhyticeros cassidix* Temminck, *Macrocephalon maleo* Muller, *Accipiter nanus* Blasius (Pitopang, *et al.*, 2014).

Other natural resources are also found such as caves, waterfall, rivers, Lindu Lake, tracking route, camping ground, beautiful landscape, tropical forests, traditional medicine. Natural resources has highest score 0,55.

2. Culture

Culture has important role in ecotourism. Most of the local residents are still maintaining their local culture. The culture has a pivotal role in managing the people's activities such as ceremonies of marriage and dead. The local wisdom is also applied managing their natural resources including forest and agriculture. Aspect of culture has a score 0,47.

3. Environmental Care Groups.

There are several environmental awareness group in the study sites, such as Kelompok Peduli Satwa Tarsius or Tersier Care Group in Kamarora A Village, Kelompok Peduli Anggrek or Orchid Care Group in Karunia Village and Forum Peduli Lingkungan or Environment Care Group in Pakuli Village. Aspect of Environmental Care Group has score 0,30

4. Agricultural Potential.

Most of local people who live surrounding the LLNP are farmers. Primary plants that cultivated by the

- farmers are paddy, cacao, and coffee. The farmers also have animal husbandry, and run fishery business. This potential could be managed through an integrated farming system so that they could improve the people income and at the end will support ecotourism program. Agriculture aspect has score 0,27.
- Support from local government.
Ecotourism program is strongly support by local government particularly at sub district and village level. All head of sub district state that they agree with ecotourism. Likewise head of villages in study sites, they support ecotourism program applied in their region as ecotourism could offer alternative job for their people. Aspect of local government support has score 0,40.

Table 3. Evaluation of *Internal Factors Analysis Summary* (IFAS)**STRENGTH**

NO	Description	WEIGHT		RATING							SCORE							Cumulative Strengths
		Relative		Toro	Anca	Pakuti	Kadidia	Kamarora A	Karunia	Tuva	Toro	Anca	Pakuti	Kadidia	Kamarora A	Karunia	Tuva	
1	Potential of natural resources (endemic flora and fauna, caves, waterfalls, lake, spring, landscape, fresh air, nesting ground maleo, traditional medicine, rafting, tracking)	4	0.15	4	4	4	2	4	4	4	0.593	0.593	0.593	0.296	0.593	0.593	0.593	0.55
2	Culture and mantained traditions (traditional art, local knowledge, ancient stones, king grave)	4	0.15	4	4	4	2	2	3	3	0.593	0.593	0.593	0.296	0.296	0.444	0.444	0.47
3	Environmental Care Groups (the tarsius care group, Cakar Maleo group, & narual orchid group, Libu Mosangu forum)	3	0.11	1	1	4	1	4	4	4	0.111	0.111	0.444	0.111	0.444	0.444	0.444	0.30
4	Potential of Agriculture, Animal Husbandery and Fishery	3	0.11	3	3	3	1	2	2	3	0.333	0.333	0.333	0.111	0.222	0.222	0.333	0.27
5	High Support from Government at Sub Distric and Village level and from local community	3	0.11	4	4	4	3	3	3	4	0.444	0.444	0.444	0.333	0.333	0.333	0.444	0.40
STRENGTH SCORE		17	0.63								2.07	2.07	2.41	1.15	1.89	2.04	2.26	1.98

Weaknesses

- Lack of accessibility
There is lack of infrastructure, particularly transportation which is essential to support tourism activities. Two study sites have relatively easy accessibility but others are quite difficult due to both the distance and also the road condition. Aspect of accessibility has score -0,38.
- Lack of supporting facilities.
Facilities such as accommodation, tourism information center, souvenir shops are very limited. Even in some villages are not available. In developing ecotourism such facilities are essential although in limited number and quality particularly accommodation. Some tourists were suggesting to develop a standard mobile accommodation for example van so it will be easy to move from one to another tourism sites. Aspect of facilities has score 0,12
- Lack of promotion
Promotion has strategic role in developing tourism. It is difficult to expect the increase in visitation without adequate promotion. A western tourist suggest that in order Lore Lindu National Park could be worldwide recognized by visitors, the park has to be intensively promoted.
- Low level of welfare and education
All villages which are located surrounding the LLNP are categorized poor. Likewise education level of the people is relatively low as most of them are only secondary school graduated. This factor has score – 0,12
- Lack of coordination
Based on interview with several key informants it could be concluded that there is lack of coordination among related stakeholders particularly in managing tourism activities in the Lore Lindu National Park. For example, when TNLL office built tourism facilities that they did not coordinate with the village leaders. Likewise, all benefits from the tourism activities are not received by the people but go directly to TNLL office. This factor has score -0,15.

Table 4. Evaluation of *Internal Factors Analisis Summary* (IFAS)

WEAKNESSES

NO	DESCRIPTION	WIGHT	Relatif	RATING								SCORE				Cumulative Weaknesses			
				Toro	Anca	Pakuli	Kadidia	Kamarora A	Karunia	Tuva	Toro	Anca	Pakuli	Kadidia	Kamarora A		Karunia	Tuva	
1	Difficulty in accessibility	4	0.15	-3	-3	-2	-4	-4	-1	-1	-0.44	-0.44	-0.3	-0.59	-0.59	-0.15	-0.15	-0.38	
2	Lack of facilities such as accommodation, telecommunication and information, restaurant, souvenir shops and tourism information center	1	0.04	-3	-3	-2	-4	-4	-4	-3	-0.11	-0.11	-0.07	-0.15	-0.15	-0.15	-0.11	-0.12	
3	Lack of tourism promotion	1	0.04	-2	-3	-2	-4	3	-4	-1	-0.07	-0.11	-0.07	-0.15	0.111	-0.15	-0.04	-0.07	
4	Villages surrounding the TNLL are categorized underdeveloped villages, low level of communities' education	2	0.07	-1	-2	-1	-2	-2	-2	-1	-0.07	-0.15	-0.07	-0.15	-0.15	-0.15	-0.07	-0.12	
5	Lack of coordination among related stakeholders	2	0.07	-1	-2	-1	-3	-3	-2	-2	-0.07	-0.15	-0.07	-0.22	-0.22	-0.15	-0.15	-0.15	
SKOR WEAKNESSES		10	0.37									-0.78	-0.96	-0.59	-1.26	-1.00	-0.74	-0.52	-0.84

Analysis of External Factors Summary (EFAS)

Opportunities

1. Regulation and policies. There are some regulations that support ecotourism development in the Lore Lindu National Park such as government regulation on tourism, forestry, and related institution. This factor has score 0,32.
2. Central and Provincial Government Support. Support from government both at central and provincial level is high. Therefore it will be easy to push some program to support ecotourism facilities in the area such as development of road, transportation, education, health, clean water tourism and conservation. This factor has score 0,24.
3. Tourists visit. In some part of tourism object in the LLNP they get many visitors both foreign and domestic tourists such as in nesting ground of Maleo Bird in Saluki and Kamarora A. their background varies from researchers, students and general visitors. These visitors, actually, could support education particularly conservation program to the local residents in the destination. This factor has score 0,24.
4. Strategic position of TNLL. The position close to the town of Palu, the provincial capital (access to airports, ports, hotels, malls, bank, hospital). This factor has a score of 0.16. TNLL position that is close to the capital city of Palu, Central Sulawesi is very strategic because it means also close to a variety of important facilities such as airports, seaports, hotels, major banks, shopping centers and even terminal. This factor has score 0,16.
5. Support from universities. Support of Higher Education and mass media is very important in encouraging ecotourism program. This factor has a score of 0.12. University both public and private as a place to carry out the “Tri Dharma Perguruan Tinggi Program” including education, research and community service has very strategic role to prepare qualified human resources. This factor has score 0,12.

Table 5. Evaluation of *External Factors Analysis Summary* (EFAS)

OPPORTUNITIES

NO	DESCRIPTION	WEIGHT	RATING								SCORE				Cumulative Opportunities				
			Toro	Anca	Pakuli	Kadidia	Kamarora A	Karunia	Tuva	Toro	Anca	Pakuli	Kadidia	Kamarora A		Karunia	Tuva		
1	Government regulation on tourism, forestry and related sectors	4	0.09	4	4	4	2	4	4	4	0.34	0.34	0.34	0.17	0.34	0.34	0.34	0.32	
2	Support from central government, provincial and regional level	4	0.09	4	3	4	2	2	2	3	0.34	0.255	0.34	0.17	0.17	0.17	0.255	0.24	
3	Tourists and researchers visit and TNLL position close to other tourism destinations in Central Sulawesi such the Togeang Islands & Tanjung Karang	3	0.09	4	3	4	2	2	2	3	0.34	0.255	0.34	0.17	0.17	0.17	0.255	0.24	
4	TNLL position close to Palu City as the capital of Central Sulawesi Province (good access to airport, sea port, hotels, banks and central police office)	3	0.06	2	2	4	2	2	2	3	0.128	0.128	0.255	0.128	0.128	0.128	0.191	0.16	
5	Support from Universities and mass media	2	0.04	3	3	3	2	2	3	3	0.128	0.128	0.128	0.085	0.085	0.128	0.128	0.12	
OPPORTUNITIES SCORE		16	0.36									1.28	1.11	1.40	0.72	0.89	0.94	1.17	1.07

Threats

1. Illegal logging in the region. This factor has score -0.10. Logging operations in the area TNLL will certainly disrupt the local ecosystem either a direct impact on flora or an indirect impact on fauna, especially birds
2. Wild animals hunting. This factor has a score of -0.10. Endemic fauna is an important attraction for visitors who visit TNLL. If fauna in the area are disturbed, ecotourism quality will decline.
3. Mining activities in this region has a score -0,09. Based on various reports that the mining activity in Dongi-dongi (Kamarora A neighbor) has been started since August 2016. There are an estimated 1,000 miners who do illegal mining activities in the region
4. The increase in population has lead to the increase in land settlements and agriculture. The majority of people who live around TNLL are farmers who cultivate paddy since the early presence of wetlands with a settled system. This factor has score of -0,11.
5. Security situation. This factor has a score of -0.09. The tourism industry is an industry that is highly dependent on the security situation. Unsafe areas will be difficult to be developed as a tourism destination.

Table 6. Evaluation of *External Factors Analysis Summary* (EFAS)

THREATS

NO	DESCRIPTION	WEIGHT	RATING								SCORE				Cumulative Threats				
			Toro	Anca	Pakuli	Kadidia	Kamarora A	Karunia	Tuva	Toro	Anca	Pakuli	Kadidia	Kamarora A		Karunia	Tuva		
1	Illegal logging	3	0.06	-1	-1	-1	-3	-2	-2	-1	-0.06	-0.06	-0.06	-0.19	-0.13	-0.13	-0.06	-0.10	
2	Wild animal hunting	3	0.06	-1	-1	-1	-3	-2	-2	-1	-0.06	-0.06	-0.06	-0.19	-0.13	-0.13	-0.06	-0.10	
3	Mining activities	3	0.06	-1	-1	-1	-2	-2	-2	-1	-0.06	-0.06	-0.06	-0.13	-0.13	-0.13	-0.06	-0.09	
4	The increase in population result in the increase in pressure to the	3	0.06	-1	-1	-2	-2	-2	-2	-2	-0.06	-0.06	-0.13	-0.13	-0.13	-0.13	-0.13	-0.11	
5	Security issue	3	0.06	-1	-1	-1	-2	-2	-2	-1	-0.06	-0.06	-0.06	-0.13	-0.13	-0.13	-0.06	-0.09	
THREATS SCORE		31	0.68									-0.32	-0.32	-0.38	-0.77	-0.64	-0.64	-0.38	-0.49

Based on the evaluation factors IFAS and EFAS, score of the four factors, including both of internal factors (strengths and weaknesses) and external factors (Opportunities and Threats). Score of these four factors are described in more detail in Table 6.

Table 7. Internal and External Factors Score

SCORE	SWOT COORDINATE							
	Toro	Anca	Pakuli	Kadidia	Kamarora A	Karunia	Tuva	COMMULATIVE
STRENGTHS	2.07	2.07	2.41	1.15	1.89	2.04	2.26	1.98
WEAKNESES	-0.78	-0.96	-0.59	-1.26	-1.00	-0.74	-0.52	-0.84
OPPORTUNITIS	1.28	1.11	1.40	0.72	0.89	0.94	1.17	1.07
THREATS	-0.32	-0.32	-0.38	-0.77	-0.64	-0.64	-0.38	-0.49
X	1.30	1.11	1.81	-0.11	0.89	1.30	1.74	1.15
Y	0.96	0.79	1.02	-0.04	0.26	0.30	0.79	0.58

From the table above it can be explained that the score of each factor is as follows:

- Strengths = 1,98
- Weaknesses = -0,84
- Opportunities = 1,07
- Threats = -0,49

Of each value of factors mentioned above, further defined the value of X and Y. X value, an internal factor, is total sum of strengths with a total of weaknesses. While Y is an external factor which is the total sum of opportunities with the total of threats.

$$X = 1,98 + (-0,84) = 1,15 \quad \text{and} \quad Y = 1,07 + (-0,49) = 0,58$$

Total score of internal factors (1.15) is greater than the external factor (0.58), showing that internal factors have more influence on the development of ecotourism around TNLL compared to external factors. Accordingly, the implementation of ecotourism development around TNLL should optimize internal factors to reduce external factors.

When depicted in the SWOT quadrant, ecotourism positions around Lore Lindu National Park are located in Quadrant I. This position indicates that the ecotourism development in the TNLL has strengths and opportunities for better development. Recommendations for given strategy is to combine the strengths and opportunities (SO).

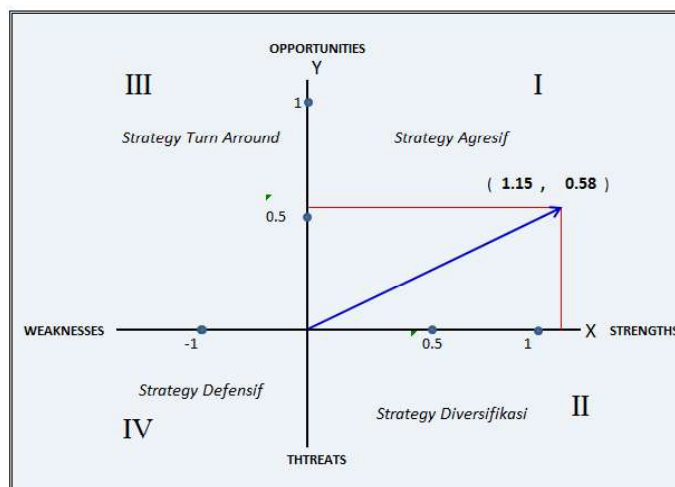


Figure 1. SWOT Quadrant of Ecotourism in TNLL

From the sum of internal and external factors as described in Figure 1 above were obtained alternative strategy of ecotourism development in TNLL by using strengths to take advantage of existing opportunities (aggressive strategy). Furthermore, Strength -Opportunity strategy for ecotourism development in TNLL described as following :

1. Based on the potential in Lore Lindu National Park and surrounding area which consists of natural resources of endemic flora and fauna, natural phenomena such as waterfalls, caves, rivers, lakes, there is also a wealth of culture and customs that are still well maintained as well as potential of agriculture, livestock and fisheries are abundant. This potential should be managed appropriately so that it can become an object of tourist attraction for visitors who come to TNLL. In other words, travelers have a variety of attractions to be enjoyed including nature, culture and agriculture. Based on this potential, ecotourism approach offered in this area is then called **"Agro-cultural based ecotourism"**.
2. Collaboration approach on Agro-cultural based ecotourism management as described above requires the cooperation of the parties in this case the parties directly related to the Lore Lindu National Park including TNLL as regional authorities, local governments who have administrative authorities outside the park and local communities who are living around TNLL. These three key actors should synergize their programs in planning, implementation, monitoring and evaluation of Agro-cultural based ecotourism. Several activities could be applied by related stakeholders in this collaboration including:
 - a. Dissemination of the importance of protected areas and biological richness contained in it for the entire life of living beings to key individuals and the wider community who live around TNLL. This activity was facilitated by BTNLL, the Forest Service and the Department of Tourism;
 - b. Training on ecotourism community about stepping and how they can get involved as a tour guide, services, restaurants, souvenir sellers, lodging services. This activity is facilitated by the Department of Tourism;
 - c. Dissemination of the importance of protected areas and biological richness contained in it for the entire life of living beings to key individuals and the wider community who live around TNLL. This activity was facilitated by BTNLL, the Forest Service and the Department of Tourism;

- d. Training on ecotourism community about stepping and how they can get involved as a tour guide, services, restaurants, souvenir sellers, lodging services. This activity is facilitated by the Department of Tourism;
- e. Environmental education through local content for students with their goals to know and understand the benefits of a variety of natural resources that surround them around TNLL. This activity is facilitated by the Department of Education and Teaching;
- f. Implementation workshop on management strategies with ecotourism in TNLL between local authorities, BBTNLL, customs agency, Animal Care Forum and the Forum of Environmental Care. This activity was facilitated by Bappeda, BTNLL, the Forest Service and the Department of Tourism;
- g. Skills training and small and medium businesses to the community around TNLL example in the production of souvenirs and snacks to support ecotourism activities. This activity is facilitated by the Department of Industry and Trade and Higher Education;
- h. The increase in sustainable food production through integrated farming system approach in order to support ecotourism program. Developed tourist destination is generally supported by a strong agricultural sector. ecotourism management in TNLL must be supported by an environmentally friendly TNLL agricultural approach which means free from chemicals and the use of organic fertilizer, so the agricultural production of food commodities, plantation and horticulture have a value added for local farmers. This activity is facilitated by the Department of Agriculture and university.
- i. Improve business of social forestry scheme such as agroforestry, silvopasture, bioenergy business, non timber business, people timber industry business. This activity is facilitated by Forestry Department.
- j. Intensive promotion of ecotourism potential in TNLL both through direct promotion by presentation of art and culture as well as using a variety of media, especially online media as well as by using the opportunities of TNLL position near Palu city, the capital of Central Sulawesi. This activity is facilitated by the Department of Tourism and BTNLL.
- k. The development of infrastructure and supporting ecotourism facilities such as roads, transportation, accommodation, and tourism information center. This activity is facilitated by the Department of Public Works and the Department of Tourism.

Implementation of SO management of ecotourism strategy in TNLL which is briefly described in activities and institutions in charge in the projects are presented in Table 8.

Table 7. Matrix of Ecotourism Management Strategies in TNLL (Strength -Opportunity)

Strategy	Activities	Institutions
SO	1. Dissemination of the importance and function of conservation areas and biodiversity value of TNLL to the people who live around TNLL	1. BBTNLL 2. Forestry Agency 3. Environmental Agency
	2. Training on ecotourism community about “Sapta Pesona” or Seven Principles of Tourism and how they can get involved as a tour guide, services, restaurants, souvenir sellers, lodging services.	1. Tourism Agency
	3. The environmental education through local content at school for students in order that they could recognize and understand the benefits of a variety of natural resources in the TNLL.	1. Education Agency 2. Environmental Agency
	4. Implementation of workshops on ecotourism management strategies with in TNLL among related stakeholders such as local government, BBTNLL, traditional institutions, NGOs and other Environmental Care Groups.	1. Regional Planning Agency 2. BTNLL, 3. Forestry Agency 4. Tourism Agency

Strategy	Activities	Institutions
	5. Skills training at small and medium businesses scale to the community around TNLL, e.g. in making souvenirs and snacks to support ecotourism activities.	1. Industry, Commerce and Cooperation Agency 2. University
	6. The Increase in sustainable food production through integrated farming system approach in order to support ecotourism program. Advanced tourist destination is generally supported by a strong agricultural sector. TNLL ecotourism management in agriculture must be supported by an environmentally friendly approach means free from chemicals and the use of organic fertilizer, so good agricultural production of food commodities, plantation and horticulture have added value for farmers.	1. Agriculture Agency 2. University
	7. Improve business of social forestry scheme such as agroforestry, silvopasture, bioenergy business, non timber business, people timber industry business. This activity is facilitated by Forestry Department	1. Department of Forestry
	8. Intensive promotion of ecotourism potential in TNLL both through direct promotion by presentation of art and culture as well as using a variety of media, especially online media as well as by using the opportunities of TNLL position near Palu city, the capital of Central Sulawesi. This activity is facilitated by the Department of Tourism and BTNLL.	1. Tourism Agency 2. BTNLL.
	8. The development of infrastructure and supporting ecotourism facilities such as roads, transportation, accommodation, and tourism information center. This activity is facilitated by the Department of Public Works and the Department of Tourism.	1. Public Work Agency 2. Tourism Agency

5. Conclusion and Recommendations

5.1 Conclusions

Based on the research result it can be concluded that:

1. Lore Lindu National Park and surrounding areas have a high potential for ecotourism in the form of natural resources such as the endemic flora and fauna, caves, waterfalls, rivers, rock megaliths, tracking route, and a beautiful view, especially in the area of Lake Lindu and customs that maintained.
2. The results of the analysis of cumulative perception of all respondents in all seven villages had Likert Index cumulative value of 88.63.
3. Based on the analysis of IFAS and EFAS show that ecotourism in Lore Lindu National Park is located in quadrant I. This position indicates that the development of ecotourism in the TNLL is in stable conditions and has strengths and the opportunities for better development.

5.2 Recommendations

To develop ecotourism in the Lore Lindu National Park, especially in the district of Sigi, several recommendations are advised as follows:

1. Improving the protection and preservation of the object of natural attractions in the form of endemic flora and fauna, caves, waterfalls, rivers, lakes in Lore Lindu National Park area as an ecotourism asset and a source of knowledge for both Indonesia and the world.
2. Preserving the culture and customs of the people around the area TNLL because besides being a tourist attraction as well as through local wisdom can preserve TNLL neighborhood of various disturbances and threats.
3. Increasing the participation of local people in ecotourism program from the planning, implementation, monitoring and evaluation.

4. Improving the education of local communities through the development of adequate educational facilities in order to produce high quality human resources in managing natural resources and to carry out development.
5. Providing skills both in the field of eco-tourism as well as business primarily to support ecotourism activities, for example as a tour guide, culinary services and manufacture of souvenirs and other businesses such as brown sugar manufacturing business, the business of making clothes from bark, and traditional herbal medicine business.
6. Improving infrastructure and supporting infrastructure facilities like roads, transportation, water, accommodation, tourist information centers, souvenir shops which is useful in addition to the needs of society as well for the convenience of visitors
7. Optimizing the sustainable development of agriculture, livestock and fisheries and environmentally friendly through integrated farming system approach.

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