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Dynamics of Tourism Development in Geosite, Gunungsewu Geopark

Primantoro Nur Vitrianto[1], Wiendu Nuryanti[2], Dwita Hadi Rahmi[3]
Faculty of Engineering, Universitas Gadjah Mada, Yogyakarta, Indonesia[1,2,3]
primantoro.nur.v@mail.ugm.ac.id[1], wiendu@gmail.com[2], dwita_hr@yahoo.com[3]

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Abstract
Purpose: The designation of the Gunungsewu UNESCO Global Geopark has implications for the development of various tourism destinations. This article seeks to reveal how the development of the Gunungsewu geopark in Gunungkidul district as a tourism destination.
Methods: This study uses a qualitative method. The data used were descriptive data, with in-depth analysis. Collecting samples through proportional sampling, the selection of samples depends on the purpose of the study without regard to the ability of a generalist.
Results: The level of development of tourism destinations in mountain geoparks varies based on Butler's classification of tourism destination development. Determination of an area with unique geomorphology cannot simultaneously lift the entire area into a tourist destination.
Limitation: This study focuses on developing a geosite seen as a tourism destination. This study emphasizes observing the development of tourism destinations using the "Tourism Area Life Cycle" approach proposed by Butler (1980).
Contribution: This research is expected to benefit the development of tourism science and geoparks in Indonesia.
Conclusion: Species diversity in the Protection Report Diary (in 2010) was higher compared to the total number of wildlife species sighted by visitors (in 2021) and during the patrol (in 2020) indicating that some wildlife species in LCC declined within 10 years.
Keywords: Butler, Destination, Development, Geopark, Gunungsewu, Tourism.
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1. Introduction

Geopark is a concept created to maintain the sustainability of a unique geological-based area. In addition, geoparks are also expected to develop the site in terms of economic improvement and community empowerment. As a conservation guard tool, geopark is a very effective tool to protect the unique geology and geomorphology that exists in an area with various protection schemes. Geopark is an area management model with unique geology that relies on three pillars: conservation of earth heritage, community development, and economic growth (Komoo, 2016).

The term geopark in Indonesia became better known and much discussed after the Batur Lake-Mountain areas were appointed as part of the Global Geopark Network in September 2012. Since then, new geoparks have emerged in several areas, although they are still in the national geopark ranking, such as Geopark Gunung Toba Caldera (North Sumatra), Mount Merangin Geopark (Jambi), Mount Belitung Geopark (Bangka Belitung), Mount Bojonegoro Geopark (East Java), Mount Tambora Geopark (West Nusa Tenggara), Mount Maros Geopark (South Sulawesi), and Mount Geopark Raja Ampat (Papua). In 2018 this number increased to 15 geoparks with the stipulation of 8 areas with unique geology as

national geoparks, namely: Silokek Geopark (West Sumatra), Ngarai Sianok-Maninjau Geopark (West Sumatra), and Sawahlunto Geopark (West Sumatra), Natuna Geopark (Riau Islands). Pongkor Geopark (West Java), Karangsambung-Karangbolong Geopark (Central Java), Banyuwangi Geopark (East Java), and Meratus Geopark (South Kalimantan).

It doesn't stop there, Indonesia also has 6 geoparks under the global geopark network, including: Mount Batur (Bali), Ciletuh Pelabuhan Ratu (West Java), Mount Sewu (Central Java, East Java and Yogyakarta), Mount Rinjani (NTB), Toba (North Sumatra), and Geopark Belitong (Bangka-Belitung). The government provides excellent support to these geoparks because geoparks are expected to accelerate equitable development and encourage economic development and sustainable development in the region.

One of the benefits of a geopark designation is that it raises awareness among the general public and the government. The forms of concern that arise include the desire to visit the area. Visits to geopark areas cannot be separated from tourism activities that have previously emerged and developed in the area. Tourism is one aspect of leisure that usually, but not invariable, involves some expenditure by the participant (Tiimub et al., 2020). The development of tourism activities in geoparks is felt to be very in line with the main purpose of geoparks as a medium to preserve the region's uniqueness, improve the economy and empower the community. The emerging and developing tourism activities will demand the area's development correlated with facilities and services. The growth and development of the global tourism industry have engendered a new paradigm of sustainable socio-economic advancement (Bitok, 2020). The link between tourism and development can be defined differently and viewed from several perspectives (Nuryanti, 1998). The relationship between tourism and development can be seen from the signs of development itself (Nuryanti, 1996).

Previous studies related to geoparks and tourism area life cycles have been carried out, but the authors have not found a link between the two in one discussion. (Zhonga et al., 2008) describe applying the Tourism Area Life Cycle (TALC) concept in China's Zhangjiajie National Forest Park. The results of the study are in the form of external and internal factors that affect tourism development. Vitrianto et al. (2021) explain that the semi-fixed element is the element that changes the most and determines the structure of tourism space in a geopark. The dynamics of tourism activities as a non-permanent element greatly influence the development of semi-permanent elements in geoforests. Pulina and Biagi (2010) explained the use of the Life Cycle (LC) approach as an analysis tool for the development of destinations and market segments on the island of Sardinia (Italy). Economy, the development of the accommodation and tourist sectors. Muangasame (2014) criticizes the Butler and Plog model by considering its validity and limitations in tourism research. Using a case study in Thailand, this paper illustrates the nature, purpose, and diversity in tourism activities that apply the four characteristics of tourism products from Butler's marketing aspect. In addition, Utama (2015) conducted tourism life cycle research related to studying the tourism economy in tourism destinations in Bali.

The development of the geosite is expected to provide welfare to the community. One of the possible forms is the functioning of a geosite as a tourism destination. The development of tourism destinations on a geosite will undoubtedly vary, so the impact on welfare will also vary. The Life Cycle tourism product method (Butler, 1980) or the life cycle of tourism product is used to observe the magnitude of the tourism development of an area on the factors forming tourist attractions by using several criteria or indicators in the geopark. This research reported here was conducted to analyze how a geosite can be assessed within the framework of tourism development using the indicators that Butler has put forward.

2. Review of related literature

UNESCO (2006) defines a geopark as "an area with unique geological elements, including archaeological, ecological, and cultural values, in which local people are invited to participate in protecting and enhancing the functions of natural heritage. The development of the diversity of the potential for earth tourism in the Gunungsewu area, where the use of earth tourism in this area can use a geotourism model in a location, often called a geopark. Robinson (2015) stated that geopark is a

concept of sustainable development in an area with a unique geoheritage that has international importance. The concept of an earth park or so-called geopark was developed as a model to increase the protection of the earth's heritage (geoheritage).

The basic concepts developed in a geopark include conservation, education, and local economic development. Concerning national development, Andriani & Pitana (2011) explains that the International Geopark Status or National Geopark is the initial stage to realize development that protects local communities' natural and cultural resources and welfare. Geoparks are relatively new developments that focus on regional and national geo-social topics, bringing together stakeholders for sustainable development (Pforr & Megerl 2006 in Newsome & Dowling, 2006).

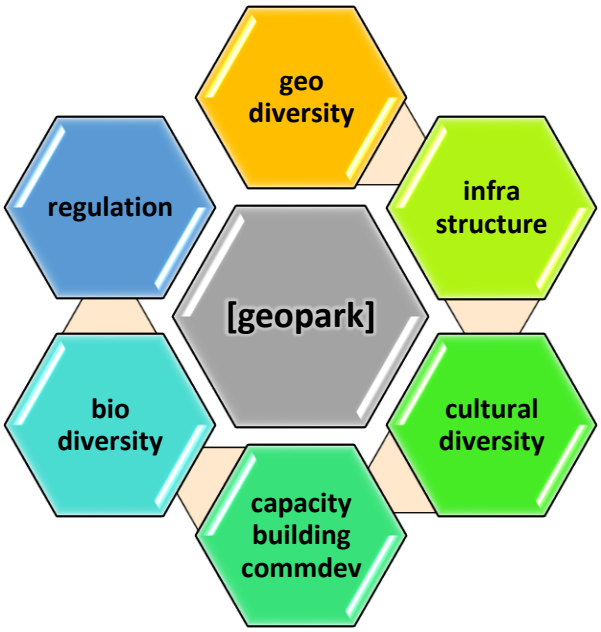


Figure 1. Pillars of geopark development
Source: adapting from the Global Geopark Network (UNESCO, 2006)

An earth park or geopark is a concept initiated by UNESCO (United Nation Educational, Scientific and Cultural Organization) as a model for protecting the earth's heritage (geoheritage). The European Geopark Network (EGN) and the Global Geopark Network (GGN) explain that geoparks are areas with specific boundaries and areas for the benefit of sustainable development. Geopark runs by considering the development of social, economic, cultural, and environmental aspects. Geoparks, according to UNESCO (2006), are national protected areas or regions where geological heritage assets have a specific beauty and distinctive appeal that may be promoted via conservation, education, and local economic development strategies.

Geoparks are expected to improve and enrich geodiversity, infrastructure, cultural diversity, capacity building, community development, biodiversity, and regulation. To simplify the concept of geoparks, in daily life, geoparks are developed as tourism destinations. The development of these destinations still maintains the main function of the geopark as a conservation area that has an increased in the local economy and community empowerment.

The level of development of the geosite as a tourism destination

The context of a tourist destination site describes a place to be marketed by various tourism stakeholders (Awaritefe & Ejemeyovwi, 2020). In developing a tourist attraction, the concept of the Life Cycle product is known, which describes the level of development of a tourist attraction associated with the

characteristics of the tourist attraction from several parameters or indicators. Territorial development occurs when there is integration by representatives of the public governance and society, by the diversity of institutional arrangements, and by the elements that make up the natural and cultural landscape (Walkowski et al., 2019). Life Cycle tourism product or tourism product life cycle is the level of development of a tourist attraction associated with the characteristics of the tourist attraction from several parameters or indicators. The stages of tourism development, according to (Butler, 1980), are as follows:

1) Exploration
   Before becoming a tourist attraction or destination, the existing potential first enters the identification and exploration stage. The condition of tourism potential is still natural. There are not many visitors. The interaction of visitors with residents is relatively high, infrastructure is limited, or an introduction to new tourism products. This condition is the main reason why this potential deserves to be a tourist destination or attraction.
2) Involvement
   In this phase, the community is directly involved by providing various services for tourists' goods and services. Socialization or advertising on a limited scale began to be carried out by the community and the government, especially before the school holidays, so tourist visits increased. Tourism infrastructure has already started to be built by the government on a limited scale and number. Tourism investment from the local community (local) is also developing at this stage.
3) Development
   The community has started to develop and promote tourism to be known as a tourism destination. The number of tourists is increasing rapidly, and new attractions are being added. There were many tourist visits, and national or international investors began to be brought in. Foreign companies (MNC) Multinational Companies began to operate and tend to replace existing local businesses due to the demands of global tourists who expect better quality standards. Tourism organizations began to form and carry out their functions, especially as promotional agencies with the government, to attract foreign investors to invest in their chosen destinations.
4) Consolidation
   At this stage, the tourism sector shows dominance in the economic structure of an area, and there is a tendency for the dominance of international networks to become stronger in their role in the tourist area or destination. Tourist visits still show a positive increase, but there has been price competition among similar companies in the tourism industry in the area. The role of local government is starting to diminish so that consolidation is needed to organize and balance the roles and tasks between the government and private sectors. In the consolidation stage, tourist areas that have attracted tourists, the number of visits is not as fast as before. It is necessary to arrange rules between hosts and tourists as guests. Tourist arrivals are growing slowly, and new markets are developing. They are focused on seasonal travelers. Services for tourists began to be provided by both national and international companies.
5) Stagnation
   In this phase, visits have exceeded their peak and cannot increase again (tends to stagnate). This condition persists with a relatively high number of visits. However, the problem is that the destination's attractiveness has faded and is no longer attractive to tourists. Visits are dominated by loyal consumers and repeat guests. The intensity of the promotional program is still not able to increase the arrival of new tourists. Destination management exceeds the carrying capacity so that negative things happen about destinations such as environmental damage, rampant criminal acts, unfair price competition in the tourism industry, and cultural degradation of local communities.
6) Rejuvenation
   After stagnation occurs, two possibilities can occur in the continuity of a destination. Suppose no efforts are made to get out of the stagnation stage. In that case, tourists will likely abandon the destination and choose other destinations considered attractive. Domestic tourists only visit the destination, and it is only crowded on weekends and holidays. Many tourist facilities have changed functions into facilities other than tourism. Tourism development needs to consider changing destinations, new target markets, and repositioning tourist attractions to other, more attractive forms. Suppose Destination Management has enough capital or private parties interested in health

care, such as building artificial attractions. In that case, such efforts can be carried out, but all actions do not guarantee rejuvenation.

7) Decline; this stage will occur if rejuvenation measures are not carried out or fail to be carried out. At this stage, the destination will experience a decline in tourists, resulting in a reduced workforce in the tourism business sector and a decrease in the quality of infrastructure facilities, resulting in a reduction in the destination's image.

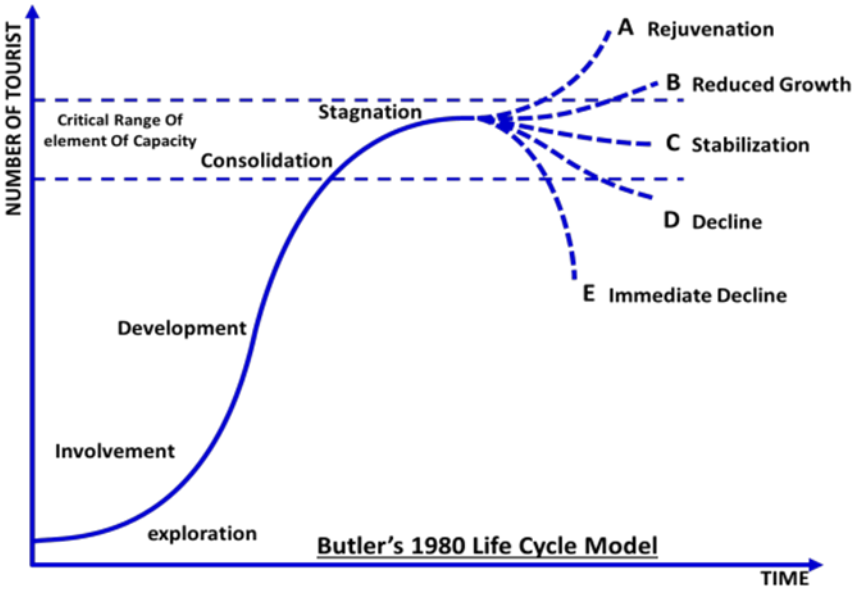


Figure 2. Ilustrasi Tourism Area Life Cycle
Source: adapting from the butler Butler (1980) model

The Tourism Area Life Cycle (TALC) (Butler, 1980) has been the main model to explain the changes and developments of tourist areas. The TALC model is recognized as a valuable method for describing and interpreting changes and developments in tourist areas in terms of its application (Kobylańska, 2013; Park, 2006; Hovinen, 2002; Prideaux, 2000) and theoretical approaches; (Muangasame, 2014; Butler, 2011; Martin & Uysal, 1990; and Oppermann, 1998) as well as criticism of the theory (Ma & Hassink, 2013). The Tourism Area Life Cycle also links in deepening and exploring the relationship between regional development studies and tourism related to Evolutionary Economic Geography (EEG) (Boschma & Martin, 2010).

3. Materials and methods

This research was conducted using field survey methods, mapping, topographic interpretation, remote sensing, and tourism development assessment. The method used in this research is descriptive research because it does not provide treatment and does not manipulate variables. Still, researchers observe the development of the geopark (geosite) parts as a developing tourist destination. The data used for the analysis came from field surveys, in-depth interviews, and previous research. Remote sensing data use 1:35,000 scale aerial photography and satellite imagery (Google Earth). A study of the development of tourism destinations is carried out through surveys and in-depth interviews. The database used is primary data and secondary data. The data from this study were collected from field surveys by observing the history of tourism development in each geosite. Further analysis is explained using the tourism area life cycle approach (Butler, 1980).

4. Discussions of findings

Geoparks are managed as natural uniqueness that must be protected and conserved, as revealed by Pforr & Megerl (2006) that geoparks are focused on regional and national geo-social. These geo-social topics can serve as instruments to coordinate stakeholders for the common goal of sustainable development. The tourism development of a geopark requires a geotourism approach. The Gunung Sewu Geopark is managed only by relying on a pure geopark approach, so tourism has not been appropriately developed

unless the geopark has developed as a tourism destination before. Nglanggeran, Pindul, Kalisuci, Cokro Cave, Sri Gethuk, Siung-Wediombo, Baron-Krakal-Kukup, Jomblang Cave, Wanagama Forest had previously developed as a tourism destination before being developed as a geopark. Other geosites such as Cokro Cave and Mulo Ngingrong Karst Valley were developed as tourist destinations shortly before being designated a geopark, so their development is different. The Kali Ngalang geosite and the Sadeng valley - Bengawan Solo Purba have not yet been developed as tourist destinations. These differences in initial conditions lead to different developments as well. Geosites that have developed as tourist destinations will experience a relatively high increase in development after being designated as geoparks. In contrast, those that do not develop as tourist destinations do not experience much tourism development.

To make it easier to classify the development of each geosite as a tourist destination by using the Life Cycle Tourism Product model (Butler, 1980), which is divided into:

1. Exploration - The occurrence of exploratory activities on tourism potential
2. Involvement - The occurrence of community and government involvement in tourism activities
3. Development - The occurrence of comprehensive development to improve the quality of the area related to tourism needs
4. Consolidation - The emergence of the need to strengthen, unite, and strengthen relationships, unions, groups, and others.
5. Stagnation - The cessation of tourism development in an area
6. Decline & Rejuvenation - A reduction in the quality of tourism-related areas

Table 1. Model checklist 1 stages of tourism development in each geosite based on TALC

Tourism Condition	1. Nglanggeran	2. Kali Ngalang	3. Gua Pindul	4. Goa (Kalisuci)	5. Gua Jomblang	6. Siung - Wediombo.	7. Lembah Kering Sadeng	8. Sri Gethuk	9. Baron-Kukup- Krakal	10. Lembah Mulo /Ngingrong	11. Gua Cokro	12. Wanagama	13. Turunan
▪ Number of tourist visits	Increase/ very much	The least	Stable	Increase/ very much	Increase/ very much	Increase/ very much	A little	Increase/ very much	Decrease	Increase/ very much	Increase / a lot	Increase/ very much	Increase / a lot
▪ Growth	Growing fast	Low	Slow growing	Growing fast	Growing fast	Growing fast	Low	Growing fast	Decrease	Growing fast	Growing fast	Growing fast	Growing fast
▪ Accommodation capacity	Tall	Very low	Very high	Tall	Tall	Tall	Very low	Tall	Very high	Tall	Low	Tall	Low
▪ The occupancy rate	Very high	Low	Tall	Very high	Very high	Very high	Low	Very high	Low	Very high	Very high	Very high	Very high
▪ Price level	Tall	Tall	Low	Tall	Tall	Tall	Tall	Tall	low	Tall	Very high	Tall	Very high
▪ Expenditure	Very high	Tall	Low	Very high	Very high	Very high	Tall	Very high	low	Very high	Very high	Very high	Very high
▪ Type of traveler	Innovators, Followers	Explorer	Followers	Innovator	Innovator	Innovator	Explorer	Innovator	Mass tourist market	Innovator	Innovator	Innovators, Followers	Innovator
▪ Image of attraction/destination	Tall	Low	Low	Tall	Tall	Tall	Low	Tall	Very low	Tall	Very high	Tall	Very high
Stages of development	Consolidation	Beginning/ introduction	Saturation	Maturity	Maturity	Maturity	Beginning/ introduction	Maturity	Stagnation, Down / decline	Maturity	grow	Consolidation	grow

Source: Analysis of each geosite using the Tourism Area Life Cycle model (Butler, 1980)

The development of the geosite using the butler model is strongly influenced by the development of tourist visits. A geosite that is well developed and utilized by the community optimally and has unique geology that can be accepted as a tourist attraction will quickly develop as a tourist destination. Zhonga et al. (2008) explained that one of the parameters used to observe tourism development is the number of tourist visits. The description of tourist visits in each geosite, Gunung Sewu geopark is as follows:

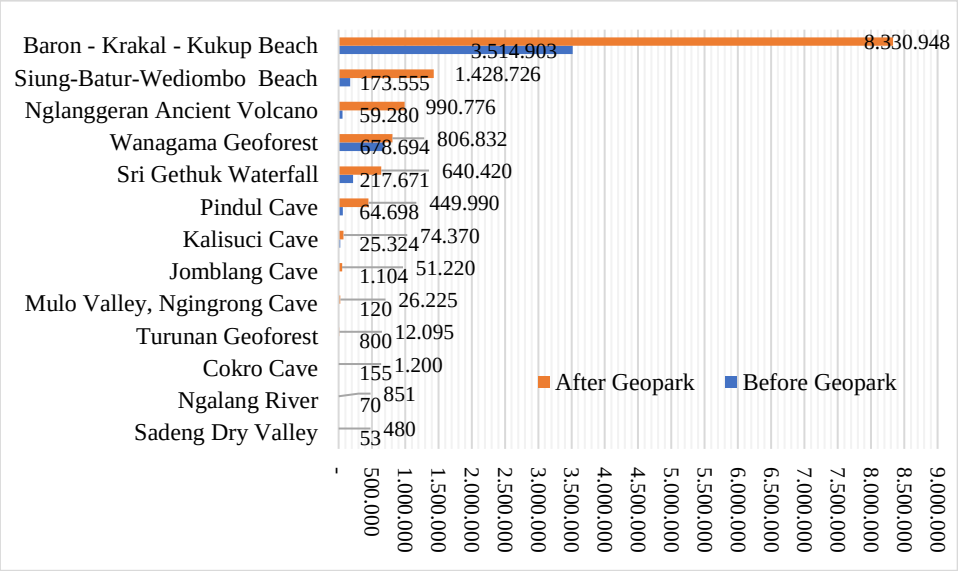
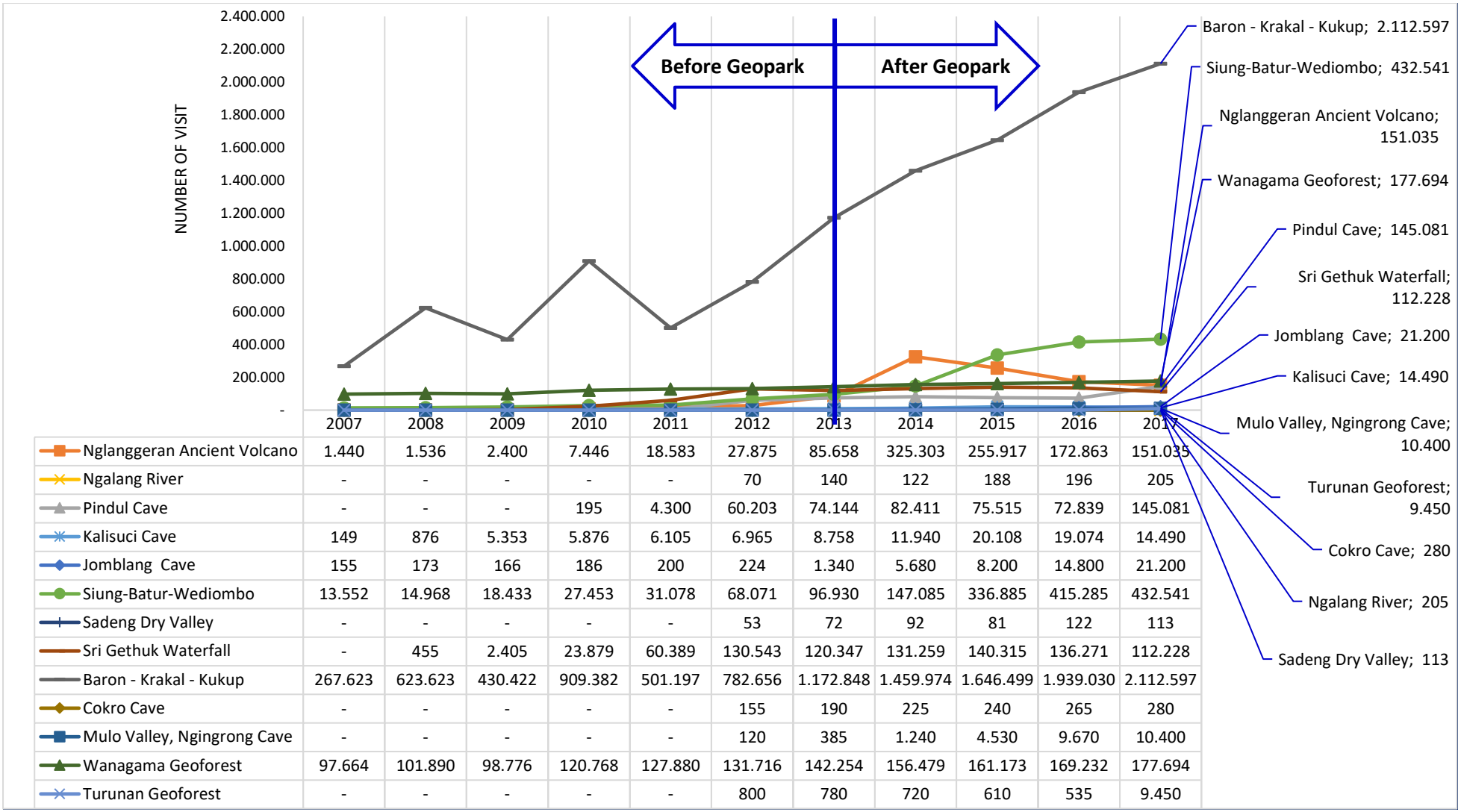


Figure 3. Tourist visits before and after geopark
Source: tourism department data, processed by the author, October 2018

From the data above, the development of tourist visits in the entire Gunung Sewu Geopark reached 3,555,986 people. The Baron-Krakal-Kukup geosite achieved the highest visit. In contrast, the three geosites with the lowest number of visits were Luweng Cokro, Ngalang River, and Sadeng Dry Valley (Bengawan Solo Purba). At the same time, the other nine geosites had an even number of visits with a range between 9,450 to 544,349. The condition and development of the geosite are strongly influenced by the development of tourism in the geosite. The gap in the data obtained by visits is noticeable. Some geosites get visits of up to millions of visitors per year. In contrast, some other geosites only get hundreds of visitors.



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Nglanggeran Ancient Volcano	1.440	1.536	2.400	7.446	18.583	27.875	85.658	325.303	255.917	172.863	151.035
Ngalang River	-	-	-	-	-	70	140	122	188	196	205
Pindul Cave	-	-	-	195	4.300	60.203	74.144	82.411	75.515	72.839	145.081
Kalisuci Cave	149	876	5.353	5.876	6.105	6.965	8.758	11.940	20.108	19.074	14.490
Jomblang Cave	155	173	166	186	200	224	1.340	5.680	8.200	14.800	21.200
Siung-Batur-Wediombo	13.552	14.968	18.433	27.453	31.078	68.071	96.930	147.085	336.885	415.285	432.541
Sadeng Dry Valley	-	-	-	-	-	53	72	92	81	122	113
Sri Gethuk Waterfall	-	455	2.405	23.879	60.389	130.543	120.347	131.259	140.315	136.271	112.228
Baron - Krakal - Kukup	267.623	623.623	430.422	909.382	501.197	782.656	1.172.848	1.459.974	1.646.499	1.939.030	2.112.597
Cokro Cave	-	-	-	-	-	155	190	225	240	265	280
Mulo Valley, Ngingrong Cave	-	-	-	-	-	120	385	1.240	4.530	9.670	10.400
Wanagama Geoforest	97.664	101.890	98.776	120.768	127.880	131.716	142.254	156.479	161.173	169.232	177.694
Turunan Geoforest	-	-	-	-	-	800	780	720	610	535	9.450

Figure 4. Chart of total tourist visits 2007-2017
Source: tourism department data, processed by the author, Oktober 2018

From the data above, the development of tourist visits in the entire Gunung Sewu Geopark reached 3,555,986 people. The Baron-Krakal-Kukup geosite achieved the highest visit. In contrast, the three geosites with the lowest number of visits were Luweng Cokro, Ngalang River, and Sadeng Dry Valley (Bengawan Solo Purba). At the same time, the other nine geosites had an even number of visits with a range between 9,450 to 544,349. The condition and development of the geosite are strongly influenced by the development of tourism in the geosite. The gap in the data obtained by visits is noticeable. Some geosites get visits of up to millions of visitors per year. In contrast, some other geosites only get hundreds of visitors.

The development of tourism in the Gunung Sewu geopark is quite diverse and dynamic. One of the indicators used in observing tourism development is the number of tourist visits, as explained by Nicely and Palakurthi (2012). This number of visits is useful for assessing the economic benefits of the tourism sector. According to the research results, the geosites most frequently visited have been designated tourist attractions, such as Baron, Krakal, Kukup beaches, Wanagama geoforest, Siung Wediombo beaches, Nglanggeran, Pindul, and Sri Gethuk.

These conditions summarize the number of visitors to each geosite before and after it was declared a geopark. Different things will be seen when the number of tourists is compared to before becoming a geopark. Mulo Valley achieved the highest increase in visits - Ngingrong Cave, Jomblang Cave, then, and Nglanggeran. At the same time, Baron Kukup Krakal, Wanagama Kalisuci, and Sadeng Valley were the geosites with the lowest increase.

Table 2. Traffic Increase Levels before and after geopark designation

Lokasi	Contribution	Number Before Geopark	Number After Geopark	The difference before & after	Total Amount	% increase
Mulo Valley, Ngingrong Cave	0.322%	120	26,225	26,105	26,345	21754.17%
Jomblang Cave	0.657%	1,104	51,220	50,116	52,324	4539.49%
Ancient Volcano Nglanggeran	4.678%	59,280	990,776	931,496	1,050,056	1571.35%
Geoforest Hutan Turunan	0.293%	800	12,095	11,295	12,895	1411.88%
Kali Ngalang	0.006%	70	851	781	921	1115.71%
Sadeng Dry Valley	0.003%	53	480	427	532	813.33%
Siung-Batur-Wediombo Beach	13.397%	173,555	1,428,726	1,255,171	1,602,281	723.21%
Luweng Cokro Cave	0.009%	155	1,200	1,045	1,355	674.19%
Pindul Cave	4.494%	64,698	449,990	385,292	514,688	595.52%
Sri Gethuk Waterfall	3.476%	217,671	640,420	422,749	858,091	194.21%
Kalisuci Cave	0.449%	25,324	74,370	49,046	99,694	193.67%
Baron Beach - Krakal - Kukup	65.432%	3,514,903	8,330,948	4,816,045	11,845,851	137.02%
Geoforest Wanagama	6.722%	678,694	806,832	128,138	1,485,527	23.80%

Source: tourism department data, processed by the author, July 2019

The differences in the level of development between geosites can be broadly divided into three groups, namely geosites with very significant improvement (>1000%), high (1000%-200%), and low (<200%). Five geosites experienced an increase of more than 1000%, while four geosites experienced an increase in the number of visits between 1000%-200%. The remaining four experienced an increase in visits of less than 200%. However, compared to the difference in the number of visits, the highest spike was found in geosites with the lowest percentage, namely Baron - Krakal - Kukup Beach, followed by Siung-Wediombo Beach and Wanagama Geoforest. The lowest number of spikes is occupied by Cokro Cave, Ngalang River, and Sadeng Dry Valley. According to the statistics presented above, there was an increase in visitors before and after being a geopark. On average, all geosites experienced an increase in the number of visits after being designated as geoparks.

Baron, Krakal, and Kukup received the highest visits among the thirteen existing geosites. It is estimated that the big name of this area has long been known as a pioneer of tourism in Gunungkidul district. Baron, Krakal, and Kukup have been known since before the 70s and began to overgrow and happen continuously, which eventually made this area a tourism icon in Gunungkidul. The development of Baron, Krakal, and Kukup shows no relationship with the status of this area as a Gunung Sewu Geopark, as evidenced by the absence of changes in the pattern of tourist visits in 2013 or 2015.

In addition to Baron, Krakal, Kukup, the number of tourist visits at Geoforest Wanagama and Siung beach, Wediombo is also relatively high with an achievement of ± 400 - 500 thousand. The development of Siung-Wediombo beach tourism is supported by the recognition of this area as a tourism destination. The developments in these two locations appear to be related to the determination of the Gunung Sewu geopark. The increase in the number of visits that occurred in 2014 took place after the determination of the Siung-Wediombo geopark.

The Nglanggeran, Pindul, and Sri Gethuk geosites received relatively high visits. However, they were still below the previous three geosites, namely at 100 – 150 thousand visits. This area was already known as a natural tourist destination several years before the determination of the geopark. Nglanggeran has a slightly different case from other areas where the number of visits in this area decreased significantly in 2014. According to the data obtained, Nglanggeran in 2015 decreased by 100 thousand trips compared to the previous year. Whereas in that year, the Gunung Sewu Geopark was designated part of UNESCO's global geopark network.

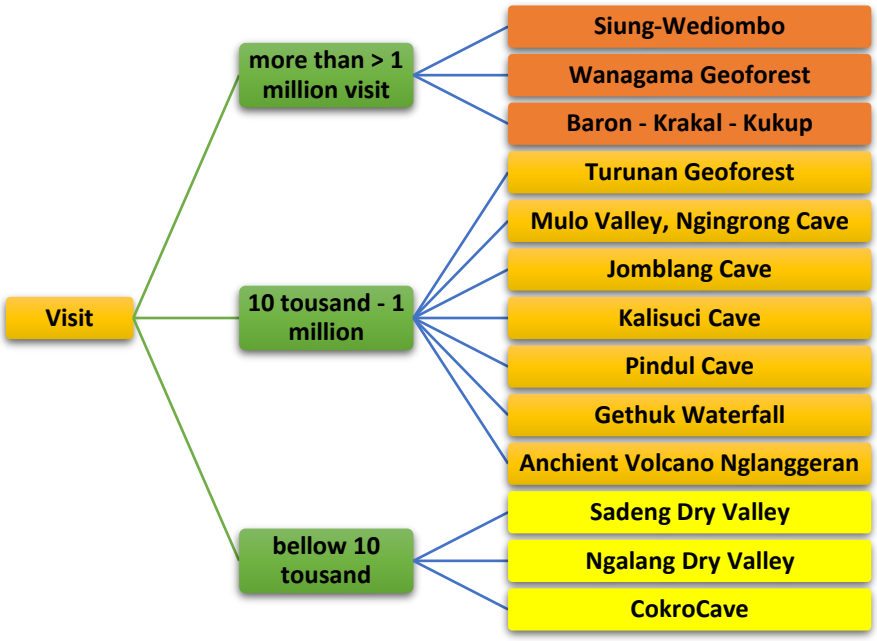


Figure 5. Grouping the number of visits at each geosite
Source: tourism department data, processed by the author, Oktober 2018

Total tourist visits until 2018 based on the data obtained can be divided into three groups, namely: high group > 1 million visitors occupied by Siung-Wediombo Beach, Wanagama Geoforest, and Baron - Krakal - Kukup Beach; a medium group with a total number of visits between 10 thousand – 1 million, occupied by Geoforest Turunan, Mulo Valley-Ngingrong Cave, Jomblang Cave, Kalisuci Cave, Pindul Cave, Sri Gethuk Waterfall, Nglanggeran Ancient Volcano; and visits under 10 thousand which are occupied by the Sadeng Dry Valley, Ngalang River, and Cokro Caves. The results of the above analysis can also be presented in a checklist model to facilitate grouping and to calculate the results, as stated in the following table:

The results of the analysis of tourism development using the Tourism Area Life Cycle model (Butler, 1980) are as follows:

Table 3. Model checklist two stages of tourism development in each geosite based on TALC

Stages of development TOURISM AREA LIFE CYCLE	1. Nglanggeran	2. Ngalang River	3. Pindul Cave	4. Kalisuci Cave	5. Jomblang Cave	6. Siung - Wediombo.	7. Lembah Kering Sadeng	8. Sri Gethuk	9. Baron-Kukup-Krakal	10. Lembah Mulo /Ngingrong	11. Cokro Cave	12. Wanagama	13. Turunan	Result
1. Exploration	---	---	---	---	---	---	---	---	---	---	---	---	---	
▪ The number of tourists is still small		✔					✔				✔			✓ Kali Ngalang
▪ Facilities and accessibility are still limited		✔					✔				✔		✔	✓ Sadeng Dry Valley
▪ The tourist attraction is still very natural		✔					✔				✔		✔	
2. Involvement	---	---	---	---	---	---	---	---	---	---	---	---	---	
▪ Emerging facilities from the local community							✔	✔		✔	✔		✔	✓ Luweng Cokro
▪ There is government intervention			✔					✔		✔	✔		✔	✓ Turunan forest
▪ The number of tourists is increasing								✔		✔	✔		✔	
▪ Facilities and accessibility are starting to grow										✔	✔		✔	
3. Development	---	---	---	---	---	---	---	---	---	---	---	---	---	
▪ The number of tourists increased sharply				✔	✔	✔		✔		✔		✔		✓ Goa (Kalisuci)
▪ There is participation from investors				✔	✔	✔		✔		✔				✓ Jomblang Cave
▪ The growing popularity of the area	✔			✔	✔	✔		✔		✔				✓ Siung - Wediombo.
▪ There was damage to the facility	✔		✔	✔	✔	✔		✔	✔	✔	✔		✔	✓ Sri Gethuk
▪ The need for planning and control & promotion	✔			✔		✔		✔				✔		✓ Mulo Valley/ Ngingrong
4. Consolidation	---	---	---	---	---	---	---	---	---	---	---	---	---	
▪ The growth rate is declining, but the numbers are still large	✔		✔	✔		✔			✔			✔		✓ Nglanggeran
▪ Emerging unilateral domination of investors	✔				✔									✓ Wanagama Forest
5. Stagnation	---	---	---	---	---	---	---	---	---	---	---	---	---	
▪ At peak times, tourists can no longer afford to be served			✔						✔					✓ Pindul Cave
▪ Environmental, social, and economic problems arise			✔						✔					✓ Baron- Kukup- Krakal
▪ The need for visitor management			✔						✔					
6. Decline & Rejuvenation	---	---	---	---	---	---	---	---	---	---	---	---	---	
▪ Decreased attractiveness/ originality of the area									✔					✓ Baron- Kukup- Krakal
▪ The emergence of a tendency to become a new concept tourism attraction									✔					
▪ Depending on the weekend or holiday, visit														
▪ The need for innovations (promotion, attraction, management)									✔					

Source: Analysis using the Tourism Area Life Cycle model (Butler, 1980)

The calculation table above shows that the development of tourism in all geosites, especially in the "development phase," saw a significant increase in the number of visits, starting from the emergence of participation from investors, increasing the popularity of the area, decreasing the quality of available facilities, and improving planning, controlling, and promotion. Five geosites occupying the development stage are Goa (Kalisuci), Jomblang Cave, Siung - Wediombo, Sri Gethuk, Mulo/Ngingrong Valley.

The development of this phase is indicated by the increasing number of visits to the five geosites. Communities around the geosites also invest, as was the case in Kalisuci Cave, where investors carried out investment activities from nearby villages in the Semanu sub-district or the city of Yogyakarta. People are interested in investing due to the increasing popularity of the area. The increasing number of tourist visits to this area will damage or decrease the quality of the available facilities. Proper development planning is expected to reduce the impact of increasing the number of visits.

Two geosites, namely the Ngalang River and the Sadeng Dry Valley, occupy the early stages of development based on observations using the TALC model. At this early stage, the number of tourist visits is still tiny, facilities and accessibility are limited, and the tourist attraction is still very natural. The Ngalang River and the Sadeng Dry Valley both have a small number of visits, and it can be said that there are no regular visits to this geosite. The condition of the two is still original, and there are no tourism support facilities available at all. Existing visits are more approximation or school assignments. In contrast to the Ngalang river and the dry valley of Sadeng, Luweng Cokro and the Derived forest are more in demand and visited. Some facilities such as bathrooms still owned by residents, parking, prayer rooms are also initiatives. In this case, the government's role in the village government is minimal in assistance, installing information boards, and improving access to this area. Under these conditions, according to the TALC model, Luweng Cokro and Derived Forest are in the Involvement stage.

Nglanggeran and Wanagama forest are geosites that are widely known by the public. Nglanggeran is a leading tourist destination in Gunungkidul Regency and is part of a strategic national tourism area. It is different from Nglanggeran, Wanagama as a conservation forest managed by UGM and used as a pilot area for forest management and germplasm breeding. The public will very well know it. The number of visits to these two geosites is still significant, but the growth rate has begun to decline. These two geosites have been managed in an integrated manner; youth organizations manage Nglanggeran, and the UGM forestry faculty govern Wanagama. Under these conditions, according to the TALC model, these two areas can be included in the consolidation stage.

Pindul cave geosite is a geosite known for its cave tubing tourist attraction or cave walking tours using used tires. There are quite a lot of visitors to this cave, up to 4000 people per day. Sometimes it even looks crowded by visitors. The manager himself has begun to feel unable to serve tourists properly at the peak of the visit. The high number of visits has also begun to cause several environmental, social, and economic problems, such as waste problems and trade competition among tourism actors in this area. This increase in visits requires good management and the need for visitor management. With these indications, it shows that Pindul cave is in the stagnation stage on the TALC scale.

The increasing number of tourist visits to the Pindul, Baron, Kukup, Krakal geosites impacts the decline in the quality of the available facilities. This decrease proves that these two geosites have entered the decline stage and require rejuvenation, such as proper development planning. This decrease also affects the quality of the attractiveness/authenticity of the area. One form of rejuvenation is the emergence of culinary tourism in this area. The density of tourist visits occurs on weekends or holidays. The decline in visits outside this weekend is attributed to the declining popularity of the geosite and the increasing popularity of other nearby beaches. The decline in tourist visits to geosites can be overcome by innovating in various fields, including promotion, attractions, management and arrangement of the area, improvement of facilities, and new icons such as the Baron's lighthouse. The development phasing findings, which are contrasted with the empirical circumstances of each geosite, are as follows:

Table 4. Developments in a geosite that started as a tourism destination

Location	Process of Reaching DTW	Initial conditions and characters	Highest Visit Rate,	Development indicators	Development stage
1. Nglanggeran Ancient Volcano (600-700 m-AMSL) Price <100k	▪ 20-40 minutes from the parking area, hike to the top, 170-220m. elevation gain ▪ 10-15 minutes from the parking area hike to the reservoir, 15-20m. elevation hike ▪ Requires physical endurance	Developed as a DTW starting 2011, in the form of a special interest tourist attraction, adventure, agro-tourism	325,303, Th. 2014 Number decreased in 2014. Contributed 4.25% of total Visiting time 4.09 hours, index repeater 36%	▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ Need for planning and control & promotion ▪ The growth rate of tourists is down, but the number is still large ▪ There is unilateral control from investors	Stage of development (Development) towards Consolidation (Consolidation)
2. Ngalang River (130-135 m-AMSL) Free entrance	▪ 5 minutes from the parking area to the river, using the elevation of the stairs -3m ▪ Requires special knowledge and knowledge	In the form of a river, it has tourism potential for particular interest in ancient fossils	205, Th. 2017, the number is increasing. 0.01% of total Visiting time 0.99 hours index repeater 12%	▪ The number of tourists is still small ▪ Facilities and accessibility are still limited ▪ The tourist attraction is still very natural	Exploration Stage
3. Pindul Cave (160-165 -AMSL) Entrance Price <100k	▪ 5-10 minutes from the parking area, the vehicle transfer to the cave, security equipment provided ▪ No skill required ▪ Requires physical endurance	Developed as a DTW starting 2011, in the form of a special interest tourist attraction for caving adventures	145,081 Th. 2017, the number is increasing. Contributing 4.08% of the total Long visit 2.50 hours index repeater 4%	▪ There is interference from the government ▪ Damage to facilities appears ▪ The growth rate of tourists is down, but the number is still large ▪ At peak times, tourists are no longer able to be served ▪ Emerging environmental, social, and economic problems ▪ The need for visitor management	Consolidation towards Stagnation (Stagnation)
4. Kalisuci (150-165 m-AMSL) Price <100k	▪ 10-15 minutes from the parking area, down the stairs (towards the underground river, safety equipment provided ▪ No skill required ▪ Requires physical endurance	Developed as a DTW starting 2009, in the form of a special interest tourist attraction, cave, and underground river crossing adventures	20,108 Th. 2015, the Number decreased 2015. Contribute 0.41% of the total Length of visit 2.9 hours index repeater 24%	▪ The number of tourists increased sharply ▪ There is participation from investors ▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ Need planning, control & promotion ▪ The growth rate of tourists is down, but the number is still large	Development (Development) towards Consolidation (Consolidation)
5. Luweng Jomblang (174-185 m-AMSL, depth 60-90m) Entrance Price >100k	▪ 10-15 minutes from the parking area, walk to the cave, single rope technic (SRT) protocol, safety equipment provided ▪ Requires expertise ▪ Requires physical endurance	Developed as a DTW starting in 2005, in the form of a special interest tourist attraction for caving adventures	21,200 Th. 2017, the number is increasing. Contribute 0.60% of the total Length of visit 3.5 hours index repeater 30%	▪ The number of tourists increased sharply ▪ There is participation from investors ▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ There is unilateral control from investors	Development (Development) towards Consolidation (Consolidation)
6. Siung Beach – Wediombo (0-30 -AMSL) Entrance Price <100k	▪ 5-10 minutes from the parking area to the beach, 15 minutes to the climbing cliff. Climbing equipment is provided. ▪ Beach tourism does not require expertise, and rock climbing requires expertise	Developed as a DTW starting in 2000, in the form of a mass beach tourist attraction and special interests in rock climbing, rock climbing	432.541 Th. 2017, the number is increasing. Contributing 12.16% of the total Visiting time 4.08 hours index repeater 6%	▪ The number of tourists increased sharply ▪ There is participation from investors ▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ Need for planning and control & promotion ▪ The growth rate of tourists is down, but the number is still large	Development (Development) towards Consolidation (Consolidation)
7. Sadeng Dry Valley (80-140 m-AMSL)	▪ It can be directly observed from the side of the road	In the form of agricultural land and river valleys, it has	122 Th. 2016, the Number decreased in 2016.	▪ The number of tourists is still small	Stage of Exploration (Exploration)

Location	Process of Reaching DTW	Initial conditions and characters	Highest Visit Rate,	Development indicators	Development stage
Free Entrance	▪ To reach the location, 150m valley on foot as deep as 70m ▪ Requires special knowledge and knowledge	the potential to develop rest areas	Contributed 0.03% of total Length of visit 0.53 hours repeater index 26%	▪ Facilities and accessibility are still limited ▪ The tourist attraction is still very natural ▪ There are facilities from the local community	to Involvement (Involvement)
8. Sri Gethuk Waterfall 104-120 -AMSL) Entrance Price <100k	▪ 10-15 minutes from the parking area, down the stairs (towards the river), 15-20 minutes by boat. ▪ No skill required	Developed as a DTW starting 2009, in the form of a special interest tourist attraction, riverside adventures, and riverside waterfalls	140,315 Th. 2015, the Number decreased 2015. Contributed 3.16% of total Length of visit 3.04 hours, index repeater 52%	▪ There are facilities from the local community ▪ There is interference from the government ▪ The number of tourists is increasing ▪ Facilities and accessibility are starting to grow ▪ The number of tourists increased sharply ▪ There is participation from investors ▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ Need for planning and control & promotion	Involvement towards development
9. Baron Beach - Krakal – Kukup (0-10 -AMSL) Entrance Price <100k	▪ 5-10 minutes from the parking area to the beach, 15 minutes to the climbing cliff. Climbing equipment is provided ▪ Beach tourism does not require expertise, and rock climbing requires expertise	Developed as a DTW starting in 1980, in the form of a mass tourist attraction for beaches, culinary	2,112,597 Th. 2017, the number is increasing. Contributing 59.41% of the total Visiting time 4.02 hours index repeater 4%	▪ Damage to facilities appears ▪ The growth rate of tourists is down, but the number is still large ▪ At peak times, tourists are no longer able to be served ▪ Emerging environmental, social, and economic problems ▪ The need for visitor management ▪ Decreased attractiveness/authenticity of the area ▪ The emergence of a tendency to become a new concept tourist attraction ▪ The need for innovations (promotions, attractions, management)	Stagnation to Decline & Rejuvenation
10. Mulo Valley, Ngingrong Cave (135-140 -AMSL) Entrance Price <100k	▪ It can be directly observed from the side of the road ▪ To reach the location, down a 150m valley on foot as deep as 70m ▪ No skill required ▪ Requires physical endurance (enter the cave)	Developed as a DTW starting 2007, in the form of a special interest tourist attraction, caving adventure, valley trekking	10,400 Th. 2017, the number is increasing. Contribute 0.29% of the total Visiting time 2.08 hours, index repeater 18%	▪ There are facilities from the local community ▪ There is interference from the government ▪ The number of tourists is increasing ▪ Facilities and accessibility are starting to grow ▪ The number of tourists increased sharply ▪ There is participation from investors ▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ Need for planning and control & promotion	Stage of Involvement (Involvement) towards development (Development)
11. Luweng Cokro Cave (240-250 m-AMSL, 18m depth) Entrance Price >100k	▪ 10-15 minutes from the parking area, walk to the cave, single rope technic (SRT) protocol, safety equipment provided ▪ Requires expertise ▪ Requires physical endurance	Developed as a DTW starting 2012, in the form of a special interest tourist attraction for caving adventures	280 Th. 2017, the number is increasing. Contribute 0.01% of the total Length of visit 3.02 hours repeater index 62%	▪ The number of tourists is still small ▪ Facilities and accessibility are still limited ▪ The tourist attraction is still very natural ▪ There are facilities from the local community ▪ There is interference from the government ▪ The number of tourists is increasing	Stage of Exploration (Exploration) to Involvement (Involvement)

Location	Process of Reaching DTW	Initial conditions and characters	Highest Visit Rate,	Development indicators	Development stage
				▪ Facilities and accessibility are starting to grow ▪ Damage to facilities appears	
12. Wanagama Geoforest (150-200 -AMSL) Entrance Price <100k	▪ 10-15 minutes from the parking area ▪ It can be enjoyed by vehicle ▪ Complete facilities provided ▪ No skill required ▪ Need interest	Developed as a DTW starting in 2005, in the form of a special interest tourist attraction, adventure forest conservation, agro-tourism	544,349 Th. 2017, the number is increasing. Contributing 15.31% of the total Length of visit 2.02 hours repeater index 64%	▪ The number of tourists increased sharply ▪ The increasing popularity of the area ▪ Damage to facilities appears ▪ Need for planning and control & promotion ▪ The growth rate of tourists is down, but the number is still large ▪ There is unilateral control from investors	Stage of development (Development) towards Consolidation (Consolidation)
13. Turunan Geoforest (240-262 m-AMSL) Entrance Price <100k	▪ 10-15 minutes from the parking area ▪ Complete facilities provided ▪ No skill required	Developed as a DTW starting 2017, in the form of a special interest tourist attraction, adventure forest conservation, agro-tourism	9,450 Th. 2017, the number is increasing. Contribute 0.27% of the total Length of visit 2.04 hours index repeater 14%	▪ Facilities and accessibility are still limited ▪ The tourist attraction is still very natural ▪ There are facilities from the local community ▪ There is interference from the government ▪ The number of tourists is increasing ▪ Facilities and accessibility are starting to grow	Stage of Exploration (Exploration) to Involvement (Involvement)

Source: researcher analysis

From the discussion above, it can be concluded that the development of a geosite as a tourism destination in a geopark is not always uniform; many things affect this development, especially the initial condition of the geosite before it turns into a geopark. A geosite, a tourist destination, will undoubtedly develop better than a geosite not derived from a tourism function. In addition, the community's contribution to developing an area has a considerable influence on the development of geoparks as tourism destinations. From this condition, the programs implemented by geoparks cannot necessarily turn an area into a tourism destination directly. Tourism development is an approach that is needed to advance an area. However, community-based tourism development does not always positively impact local communities (Prakoso et al., 2020).

In Butler's calculations, the visit factor is one of the main keys determining the grouping of these developments so that the community's ability to accept the geosite as a destination and the motivation for visiting the geosite is also a determinant of how the development of a geosite as a tourism destination. The following diagram shows the results of observing the development of a geosite as a tourism destination using the model Butler (1980):

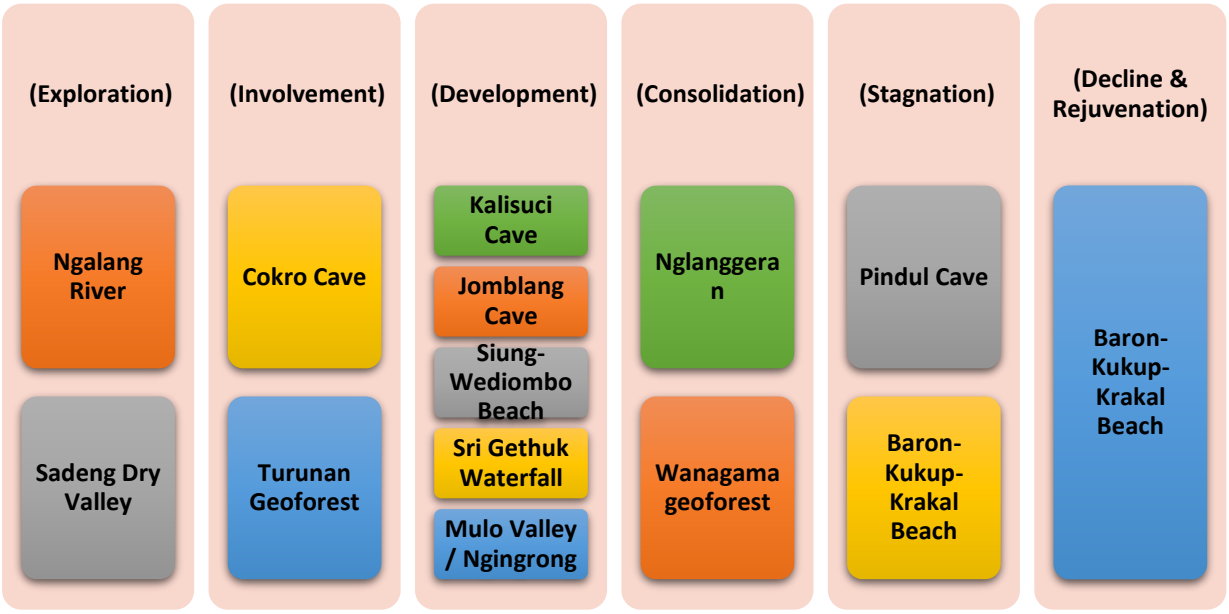


Figure 6. Grouping the number of visits at each geosite
Source: Researcher, 2018

5. Conclusion

Research on the development of geosite tourism destinations in a geopark concludes that the development of geosites in a geopark is very diverse and not always evenly distributed even though it is carried out with the same planning. This development is strongly influenced by the development of the number of tourist visits to the geosite.

Differences in the development of geosite tourist destinations are influenced by the initial conditions of the area before it turns into a geosite. Geosites with initial conditions as tourist destinations will adapt more quickly to the programs owned by geoparks so that visits will increase and tourism will be easier to develop. Ideally, if the geosite is not initially developed as a tourist destination, its development will not be optimal

Limitation and study forward

The following recommendations are proposed:

1. Twenty–two (22) of the 28 animal species observed during the patrol were least concerned although some including *Tragelaphus scriptus* were rare during the study. There is therefore a need for a regional reassessment of the species based on the IUCN guidelines.
2. Also, eco-tourists to LCC should be given more opportunities to give feedback about their experience with wildlife. The information provided by the ecotourists could be a valuable resource for biodiversity conservation policy-making and also a reference for future researchers.
3. To mitigate primate-human conflict in LCC, visitors must be advised to stop feeding the monkeys.
4. Researchers have shown that there are critical breeding and nesting periods when animals are most vulnerable to disturbances. In such periods, appropriate restrictions of ecotourism activities should be enforced.
5. Playing music within the LCC forest should be prohibited. Efforts must be made to keep noise levels low and maintain a specified minimum distance between visitors and wildlife (Jilo, 2018). For example, the minimum distance from which visitors are allowed to view sea lions at Seal Bay is 6m (Wolf & Croft, 2010).

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