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QUALITY AND CARRYING CAPACITY OF BEACHES FOR RECREATIONAL ACTIVITIES IN AMPELGADING DISTRICT, MALANG REGENCY, INDONESIA: HIGH OR LOW?

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Abstract: The coastal in Ampelgading has a tourism potential that needs to be optimized. The research aimed to describe the quality and carrying capacity of the beach for sustainable recreational activities. This research uses descriptive methods with quantitative and qualitative approach. This research used primary data that obtained from visitor interview and secondary data that obtain from government publication. Variables in this research are Accessibility, Environmental Quality, Comfortability, Infrastructure and Aminities. Data analysis uses weighting and scoring. The results showed that Ampelgading classified in very high level of quality and carrying capacity for recreational activities. Tourism managers and local governments need

Key words: Quality, Carrying Capacity, Recreational

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INTRODUCTION

Tourism is an industry that is very important to be developed because the activities carried out in the ecosystem have an impact on various economic sectors in society. The tourism sector can be used to encourage economic change and open up job opportunities, increase income, and improve the quality of life of local communities (Kodir et al., 2019). Also, tourism will increase the role of several supporting sectors such as travel agents, handicrafts or souvenir industries, tourist objects and attractions, hotels, and restaurants to support development (Arinta et al., 2016). The keys factors determination in coastal tourism development can be done through 2 stages of analysis. The first analysis is to identify the factors that influence the quality of coastal tourism. The second determinant is the carrying capacity of coastal tourism development. The key factors in question are the potential quality of coastal tourism attractions, local government policies, demand, community participation, facilities and infrastructure, security, spatial tourism planning, promotion and marketing, institutional capacity, attraction management, and economic contribution (Sumarmi et al., 2020). Most of the southern part of the Malang Regency consists of coastal areas. Some of the beach tours in the coastal area of Malang Regency include Sendang Biru beach, Balekambang beach, Bajulmati beach, Tambak Rejo beach, and Ngliyep Beach Tourism Park (Kristyarini et al., 2015). The rows of beaches in the south of Malang Regency are very diverse from the east to the west, including Pantai Licin, Sipelot, Lenggoksono, Tambakasri, Tamban, Sendang Biru, Bajul Mati, Wonogoro Balekambang, Kondang Iwak, Kondang Merak, Bantol, Sendang Purwaningsih, Ngliyep, Jonggring Saloko, Mondangan (Malang Regency Regional Regulation Number 3 of 2020). Based on Malang Regency Regional Regulation No. 3/2020 concerning in Regional Spatial Planning, Malang Regency has a huge opportunity to increase the number of tourist visits. The following is the number of tourist visits in Malang Regency during the last three years which can be seen in Figure 1.

One of the districts that has good coastal potential is Ampelgading. The beach in Ampelgading has unique characteristics that are different from other beaches in Malang Regency. The beach character has black sand. This black beach sand comes from sedimentation from Mount Semeru. Ampelgading District has four beaches, namely Licin Beach, Watu Mbengung Beach, Kleweng Beach, and Lambu Pawon Beach. All beaches are still classified as natural because it has not been optimally utilized so that it needs a study. Beaches provide a profitable environment for tourism (Holden, 2016; Nelson et al., 2000). The distribution of beaches in Ampelgading can be seen in the following Figure 2.

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High demand is placed on coastal resources to meet tourist expectations. The increase in coastal tourism has driven the rapid development of coastal areas, which has created anthropogenic pressures on the coast. This in turn has affected the quality of the coastal environment, the recreational experience of tourists, and human welfare (Gössling, 2002). The purpose of this study is to determine the quality of beaches and carrying capacity for recreational beaches. The study of beach recreation quality was developed because of the concerns about the management quality of coastal recreation (Peña-Alonso et al., 2018). The study of the quality of beach recreation is often based on visitor perceptions (Lozoya et al., 2014; Morgan et al., 2000; Peña-Alonso et al., 2018; Tudor and Williams, 2006). If the quality of coastal recreation is known, it will be possible to develop coastal tourism related to management. This corresponds to Peña-Alonso et al. (2018), recreational quality indicators are very useful to assist in coastal management so the potential of the beach can be optimized. Coastal potential needs to be developed to sustain the community's economy. The coastal environment, especially the coast, consists of two interacting and mutually dependent subsystems, namely natural and socio-economic factors. The primary interest of the coastal manager is to establish, and maintain, the sustainable relationship components in these two subsystems (Cendrero and Fischer, 1997). The maintenance of a healthy coastal environment, especially through the protection of natural habitats and reducing pollution has begun to be put into action. According to Klein et al. (2004) the economy of the coastal state is highly dependent on the income generated by coastal tourism and the quality of its beaches. Also, the beach is a natural tourist destination with many visitors.

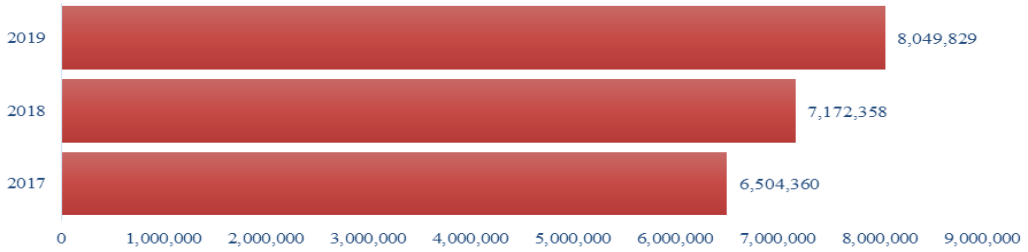

Figure 1. Number of tourist visits in Malang Regency starting 2017-2019 (Source: Badan Pusat Statistik, 2020)

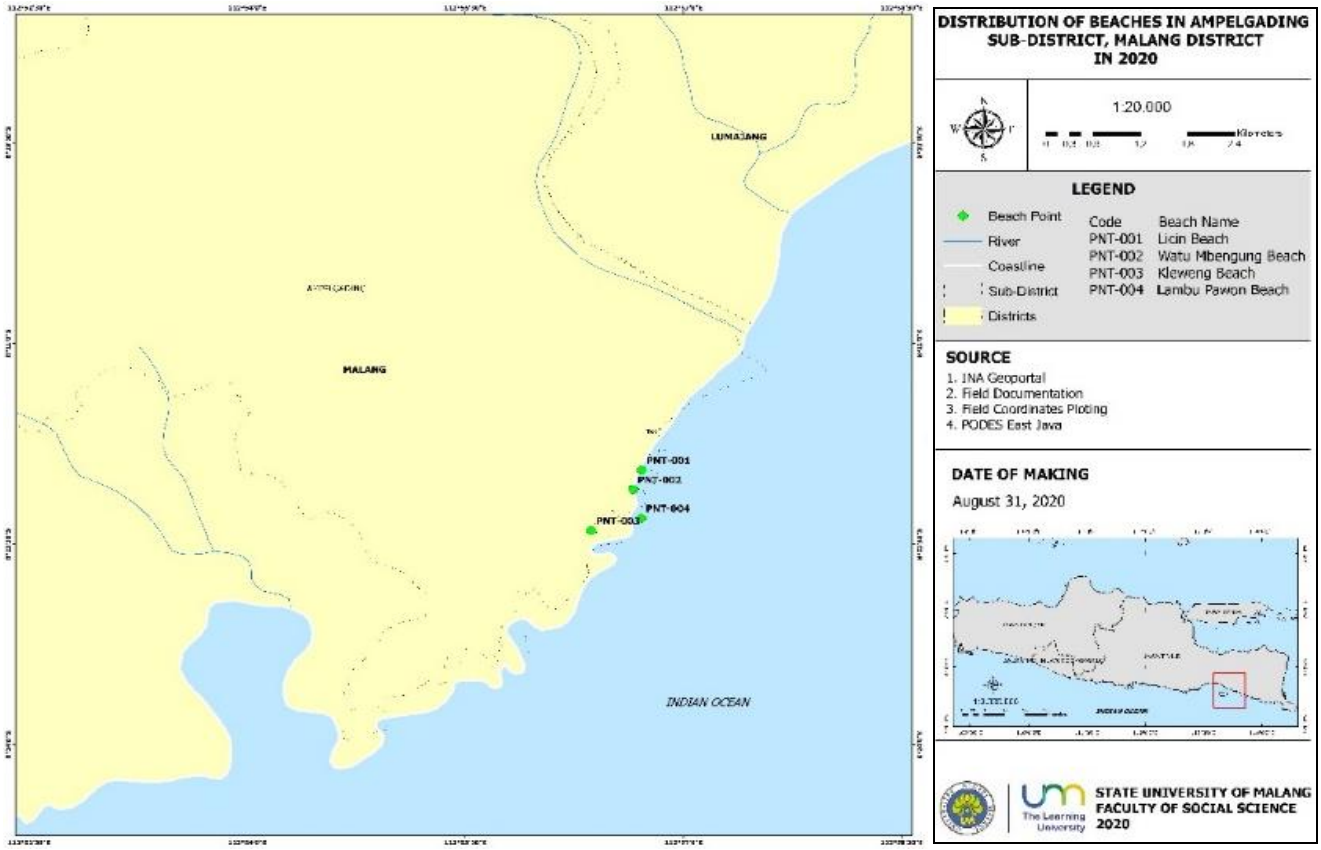

Figure 2. Coastal distribution in Ampelgading District, Malang Regency (Source: researcher data analysis, 2020)

Therefore, information about the coast is very important because it aims to control and conservation. Control and conservation can be carried out by knowing the carrying capacity of the area. Carrying capacity is based on the idea that the environment has the maximum capacity to support the growth of an organism. According to Lim (1998), the carrying capacity of an area is the accommodation of tourists with high satisfaction but has minimal impact on existing resources. Carrying capacity is a limitation for tourists in tourism activities (Zhiyong and Sheng, 2009). In developing the concept of tourism, it is characterized by limiting the number of tourists. If in tourism activities the number of tourists visiting is not limited, this can threaten the sustainability of the resource itself (Pickering and Hill, 2007). Research on the quality of beaches for tourism

activities and the carrying capacity of the environment has already existed such as evaluation of the coastal recreation index (Mustain et al., 2015), environmental quality indicators for the classification of recreational beaches (Barbosa de Araújo and da Costa, 2008), coastal carrying capacity management (Silva et al., 2007). While the purpose of this research is to determine the quality and carrying capacity of the beach which is still natural and recently opened for recreation.

METHOD

This research uses a descriptive method with quantitative and qualitative analysis techniques. Research objects for this study were Licin Beach, Watu Mbengung Beach, Kleweng Beach, and Lambu Pawon Beach. The primary data used include interviews and observations with visitors of Licin beach, Watu Mbengung Beach, Kleweng Beach, and Lambu Pawon Beach. Secondary data were obtained from government agencies. When averaging is applied to the evaluation of indicators, the primary data method is used to scale individual intervals for scoring from 1 to 5 (Peña-Alonso et al., 2018). The partial index value (Is) according to (Peña-Alonso et al., 2018) is calculated from the relationship between the number of values given by each variable obtained (Vi) with the maximum value in the variable (Vp max). $$Is = \frac{Vi}{Vp\ max} \quad (1)$$

Therefore, a single value between 0 and 1 obtained for each group of variables which include each index applied in each study area. The indicators and variables in this study were taken through literature reviews (Ariza et al., 2008; Barbosa de Araújo and da Costa, 2008; Botero et al., 2015; Cervantes and Espejel, 2008; Leatherman, 1997; Morgan et al., 2000). The Coastal Quality Index developed by Ariza et al. (2008) is used as the initial basis for compiling the index. This research was conducted with the assumption to analyze the recreational quality indicator system by integrating quantitative and qualitative techniques. The Coastal Quality index for recreation according to Peña-Alonso et al. (2018) is described in the following Table 1.

Table 1. Coastal Quality Indicators for Tourism (Sources: Peña-Alonso et al., 2018)

Indicator	Category				
	1	2	3	4	5
Accessibility					
Footpath to the beach	> 500 m	-	500 m		<200 m
Public car park	Not available				Available
Telephone signal	Not available				Available
Access to the beach	Not available				Available
Directions to the beach	Not available				Available
Bicycle Parking	Not available				Available
Information signs	Not available				Available
Environmental Quality					
Permanent Noise	Yes				Not
Water pollution	Yes				Not
Waste Sand (%)	> 40	40-25	25-15	15-5	<5
Garbage	Yes				Not
Comfortability					
Rip Current	Every now and then		Rarely		There is no
Wave Energy	Height (> 1.5 m)		medium (0.5-1.5 m)		Low (0.5m)
Wind velocity	High		Moderate		Low
Air Temperature (Noon)	<15/38 C		15-27 / 32 - 38 C		27 - 32 C
Meteorological Conditions	Rain	Storm	Cloudy	Cloudy	Bright
Beach Composition	Gravel	Sand / gravel		Coarse sand	Fine Sand
Beach-tide width (m)	<15 /> 50		<15-20 / 35-50		20 and 35
Nuisance Animal	General		Every now and then		There is no
Infrastructure					
Physical Carrying Capacity	<12 m		12-16 m		> 16 m
Embankments and breakwaters	Not		only one		Some
Amenities					
Service beach			basic		many
Number of stalls near the beach	0-1 each <50 m		1 on the beach		0-1 each <50m
Payphone	> 300m		150-300m		<150m

In addition, the analysis used is an analysis of the carrying capacity of the area. The carrying capacity of ecotourism is classified as specific and is more related to the environmental (biophysical and social) carrying capacity of tourism activities and their development. The tourism carrying capacity can be calculated by (Yulianda et al., 2010):

$$Carrying\ Capacity = K.\frac{Lp}{Lt}\ x\ \frac{Wt}{Wp} \quad (2)$$

Information:
CC = Carrying capacity area
K = potential ecological visitors per unit area
Lp = area that can be utilized
Lt = Unit area for specific needs
Wt = Time provided by the area for tourism in one day
Wp = Time spent by visitors for each activity.

Recreational coastal ecotourism and beach sports can be seen in Table 2. It is assumed that everyone needs a coastline length of 50 m, because visitors will carry out various activities that require a large space such as sunbathing, cycling, walking, and others. The visitor Ecological Potential and Activity recreation can be seen in Table 3.

Visitor activity time (Wp) is calculated based on the length of time spent by visitors to carry out tourism activities. Visitor time is calculated with the time allocated for the area (Wt) (Table 2). Area time is the length of time the area is opened in one day, and the average working time is around 8 hours (8 – 16 hours).

RESULT AND DISCUSSION

Coastal Potential of Ampelgading District

The location of an area or area can be seen from various aspects including astronomical and administrative location. Astronomical location is the location of an area based on latitude and longitude. Malang Regency is located at 112° 17' 10" – 122° 57' East Longitude and 7° 44' 55" – 8° 26' 35" South Latitude (Badan Pusat Statistik, 2019). An administrative location is the location of an area seen from other administrative areas. Malang Regency is administratively divided into 33 districts. One of the districts in the easternmost part of Malang Regency is Ampelgading District. Ampelgading District has Licin Beach, Watu Mbengung Beach, Kleweng Beach, and Lambu Pawon Beach. These four beaches are visually unique. However, this potential is still not optimally utilized. Pantai Licin has a fairly large coral reef. Licin Beach is more unique than other beaches because the sand in this beach is black, which is the result of sedimentation from Mount Semeru, which empties into the southern side of the Indian Ocean (Arinta et al., 2016). Another uniqueness of Licin Beach is that on the way to the location you can see the beauty of the cold lava path from Mount Semeru (Arinta et al., 2016). This beach is not widely known by the tourists so it is still natural. The view of the beach can be seen in Figure 3.

Table 2. Potential Ecological Visitors and Activity Areas for recreation (Source: Yulianda et al., 2010)

Type of activity	Σ Visitor	Unit Area (Lt)	Information
Beach Recreation	1	50 m	1 person every 50 m Long beach
Sports Tourism	1	50 m	1 person every 50 m Long beach

Table 3. Visitor Ecological Potential and Area of Activity recreation (Source: Yulianda et al., 2010)

No.	Activities	Time required (Wp - (hour))	Total Time 1 day (Wt - (hour))
1	Sun	2	4
2	Beach Recreation	3	6

Figure 3. The charm of the black sand of the Licin Beach and Cold lava flow from Semeru on the way to the beach (Source: Primary Data, 2020)

Table 4. Results of the Partial Quality Index of Beaches in Ampelgading District (Source: Data Analysis, 2020)

	Accessibility	Environmental Quality	Comfort	Infrastructure	Amenities
Licin Beach	0.8	0.8	0.7	0.8	0.2
Watu Mbengung Beach	0.3	0.8	0.6	0.8	0.2
Kleweng Beach	0.3	0.9	0.8	0.8	0.2
Lambu Pawon Beach	0.3	0.9	0.8	0.8	0.2

Table 5. Results of the analysis of the carrying capacity of the coastal area in Ampelgading District (Source: research data analysis, 2020)

No.	**Beach**	**Activities**	**Carrying Capacity (Person / Day)**
1	Licin Beach	Beach Recreation	163
2	Watu Mbengung Beach	Beach Recreation	85
3	Kleweng Beach	Beach Recreation	96
4	Lambu Pawon Beach	Beach Recreation	71

Watu Mbengung Beach also has its own uniqueness. For example, one of the coral in this beach is quite long. The beauty of Watu Mbengung beach is obvious when the waves break on the reef. This beach is still relatively new for tourist destinations in Malang Regency. The journey to this beach is quite difficult, causing this beach to be frequently visited by the nature lover community. Kleweng Beach has shorelines and steep coral. This beach is usually used for fishing spots. Access to the beach can be reached on foot for about 1 Km. This beach has quite substantial waves. This beach has very fine white sand. Lambu Pawon beach is still relatively new in Malang Regency. This beach has quite steep coral, and it becomes the uniqueness of this beach. The form of this beach is a cape so it is usually used for fishing spots. This beach has very black beach sand but the grains are fine so it is very safe to play. This beach is close to the shoreline, there are scattered small rocks.

Beach Quality Index for Recreational Activities in Ampelgading District

Coastal quality index assessment is very important to know the actual condition of the coast and coastal management (Pantus and Dennison, 2005). There are 5 aspects measured for the beach quality index for recreational activities, namely accessibility, environmental quality, comfort, activities and infrastructure as well as facilities. Results of the partial index of beach quality in Ampelgading Regency can be seen in Table 4. Based on the average value obtained from the partial index, it is generally moderate to high for all types of beaches, but there is still a low value in each variable. The beaches in Ampelgading District for parameters of environmental quality, comfort, activity and infrastructure are classified as high but are still low on parameters of accessibility and facilities. When depicted in the diagram, it has a pattern Figure 4.

The quality of beaches in Ampelgading District for recreational activities is classified as high, especially the quality of the environment, comfort, activities and infrastructure that are classified as attractive for tourists to visit. The environmental quality of all beaches is determined by the presence of trash and air and noise pollution. Accessibility which is far from Malang with a distance of about 85 km causes many tourists who do not understand all beaches. The beach in Ampelgading provides attractive activities and infrastructure because this beach is relatively newly opened for tourism and is still natural so that a few tourist visits cause quite high comfort on the beach. Tourism deals include those offered by tourism destinations to real and potential tourists. One of the products offered in the tourism industry is beach attractions (Herat et al., 2015). Another beach attraction is due to the natural environment which is still naturally pollution free. The beach has its own uniqueness if the environmental conditions are still natural (Wigo et al., 2020). When the environment is still natural, it greatly affects comfort. The comfort of the beach is always supported by the role of the tourism manager. Beach tourism managers try to make visitors comfortable by providing various kinds of facilities such as gazebos, restaurants and swings. The facilities and infrastructure provided are expected to be able to attract tourists in an effort to promote the potential of beaches in Ampelgading Regency. The facilities on the beach can be seen in Figure 5.

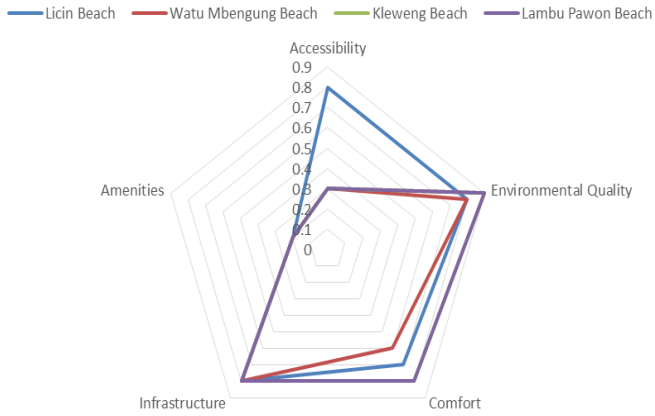

Figure 4. Patterns of coastal environmental quality parameters for recreational activities in Ampelgading District (Source: research data analysis, 2020)

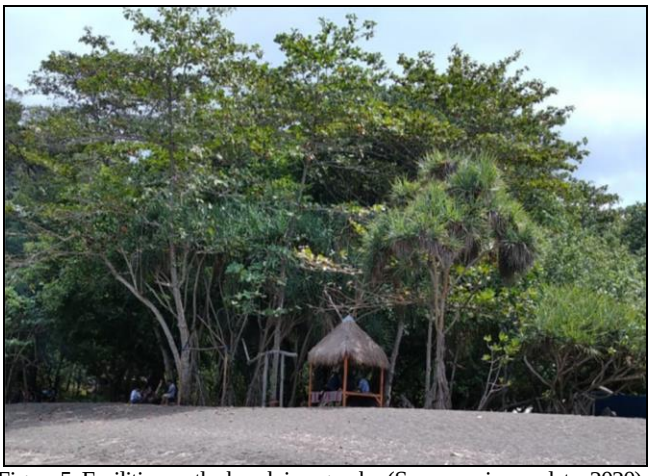

Figure 5. Facilities on the beach is a gazebo (Source: primary data, 2020)

The beach comfort indicator in Ampelgading District consists of parameters of beach morphological conditions, weather on the beach. Morphological conditions are determined by the slope of the coast. The slope of the beach is flat so that visitors feel safe (Yulianda, 2007). The comfort of the beach is also measured whether or not there are dangerous biota because it is feared that it will disturb tourist visitors (Yulisa et al., 2016). Weather and climate are major influences on the tourism sector around the world (Çalişkan and Kelkit, 2008), which affect the length and quality of tourism seasons and environmental resources (Calişkan and Kelkit, 2008). Climatic conditions allow or support outdoor tourism or certain recreational activities (Çalişkan and Kelkit, 2008). High quality environment, comfort, activities and infrastructure need to be supported by the development of accessibility and facilities. Accessibility to the beach began to be developed by making road improvements. Accessibility and facilities in the district still need to be improved because accessibility and facilities are what tourism destinations offer to tourists (Herat et al., 2015). Accessibility is all that can make it easy for tourists to visit a tourist destination (Herat et al., 2015). Accessibility to beach has only been used as a tourist attraction, so that there are still few transportation facilities (French and Craig-Smith, 1995; Priskin, 2001) while the facilities function to meet the needs of tourists while staying in tourist areas (Herat et al., 2015). Fulfillment of facilities is a basic need in order to provide services to tourists (Salamah et al., 2017). The facilities on the beach in Ampelgading Regency which are still limited need to be added to encourage sustainable coastal development.

Based on the trend value, the quality of the beach for recreational activities in Ampelgading District is still high. This high trend value indicates that the quality of the beaches in Ampelgading District for recreational activities is very good. This shows that good quality beaches for recreational activities are needed as the basis for the development of sustainable tourism. There are four tourism components that must be considered in the development of tourist objects, namely, attractions, amenities, accessibility and tourism institutions (Abror, 2020; Boniface et al., 2006). Tourism development is defined as an effort to complete or improve the facilities and services needed by the community (Prima and Sobandi, 2020). This pattern is actually based on the development of ecotourism. Ecotourism is part of nature-based tourism and is related to experiences in remote areas or nature that foster understanding and appreciation of the need to conserve the natural environment in a way that preserves resources, culture, economy and local communities (Priskin, 2001).

Analysis of Coastal Carrying Capacity in Ampelgading District

The carrying capacity of ecotourism is very important to maintain an environment sustainably for ecotourism activity. The results of the analysis of carrying capacity of the coastal area in Ampelgading District is in Table 5. Based on the results of the analysis of the carrying capacity of the coastal ecotourism area in Ampelgading District, it has different carrying capacities for recreation, namely Licin Beach (163 people per day), Watu Mbengung Beach (85 people per day), Kleweng Beach (96 people per day), and Lambu Pawon beach (71 people per day). The average visit to the beach in Ampelgading District is 60 people. So it can be concluded that this beach can accommodate all tourist activities carried out by visitors properly without exceeding the carrying capacity of the area so that the sustainability of this beach is maintained. Carrying capacity is the number of tourists who are physically accepted in the area provided at a certain time without causing disturbance to nature and humans (Yulianda, 2007). Besides, the preservation of this beach can be maintained through the carrying capacity of the environment with restrictions on visitors. This corresponds to Yulianda et al. (2010), tourism development is not a mass tourism, it is easily damaged, and the space for visitors is very limited. It is necessary to determine the carrying capacity of the area. Some things that can be done to reduce the impact of tourism are limiting travel tracks, scenic spots, permanent campsites, accommodation provision, and limiting the number of tourists (Pickering and Hill, 2007). The concrete steps that need to be developed based on the results of the analysis of the coastal quality index for recreation and the carrying capacity are:

1. Forming a tourism-conscious community to manage the beaches in Ampelgading District, especially for Wate Mbengung Beach, Kleweng Beach, and Lambu Pawon Beach.
2. Tourism awareness groups work with local governments to build accessibility in order to create local economic development.
3. The Village Government encourages links with travel units (travel agents) to promote beaches in Ampelgading District.
4. Encouraging participation and empowerment of communities around the coast in Lebakharjo Village, Ampelgading District, especially the fishing communities.

The quality of the beaches for recreational activities is good and the carrying capacity of the area is suitable, so the beaches in Ampelgading District can be used for sustainable tourism development.

It is hoped that sustainable tourism development can be utilized by the community because it will grow the local economy, especially in Community Based Tourism. The destination in Community Based Tourism development is used to create tourism for residents and the residents of the tourist destinations. Community-based tourism development can works fine if planners and the public are aware of the promotion (Sumarmi et al., 2020). So, promotion can be done if planners and the community understand the uniqueness of the beach in Ampelgading District. This is also supported by the research results of Albert and Dinah (2018), Giampiccoli et al. (2020), Prabhakaran et al. (2014), and Sumarmi et al. (2020). Environmental, economic and cultural preservation in developing tourist areas are interconnected.

CONCLUSION

The results showed that the quality of the environment, comfort, activities and infrastructure that are classified as attractive for tourists to visit and the carrying capacity of the area that is still maintained, the beach can be recommended for sustainable tourism development. Development of sustainable tourism can be done by:

1) Forming a tourism conscious community to manage beaches -beaches in Ampelgading Regency, especially Wate Mbengung Beach, Kleweng Beach, and Lambu Pawon Beach.

2) Tourism awareness groups work with local governments to build accessibility in order to create local economic development.

3) The Village Government encourages links with travel units (travel agents) to promote beaches in Ampelgading Regency.

4) Encouraging participation and empowerment of communities around the coast in Lebakharjo Village, Ampelgading Regency, especially fishing communities

This study recommends that tourism managers and local governments pay attention to developments in accessibility and facilities and calculate the carrying capacity of the area. Further research can be continued on the development of facilities and accessibility of natural beaches with attention to environmental sustainability

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