The Potency of Jatibungkus Geosite as One of Geotourism Destination of Karangsambung – Karangbolong National Geopark

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Abstract: Jatibungkus is one of limestone cave geosite in National Karangsambung – Karangbolong Geopark, managed by Langse Pokdarwis (Kelompok Sadar Wisata). The objective of the study is to improve the economical value of geoturism as an alternative livelihood of local people in Jatibungkus through geosite development. This study uses four methods, regional geological studies, field research, geosite and geomorphosite assessment analysis, and planning the geotrail system inside and outside around the geosite. This research show that Jatibungkus Geosite is isolated hill with unique cave ornaments in geological features. This geosite is also related to olisostrom mechanism in Karangsambung Formation. Based on the geosite and geomorphosite assessment analysis, Jatibungkus Geosite eligible as a geotourism object with the highest feasibility average values in conservation values of 87,5%. The other feasibility values are economical values of 50%, educational values of 50%, scientific and intrinsic values of 41,67% and added values of 40%. Geotrail system in this geosite is integrating unique visual cave feature and structural morphology in the geosite area. This geotrail system is also integrated with other transportation routes and connected with other geosites in the National Karangsambung - Karangbolong Geopark area.

Keywords: geopark; geotourism; geotrail; Jatibungkus; Karangsambung; Karangbolong

1 Introduction

Karangsambung – Karangbolong Area has been determined as Karangsambung – Karangbolong National Geopark (GNKK) by the Indonesian National Geopark Committee (ADHOC) on 29th November 2018. This status shows that Kebumen Regency has committed to build and to develop the potential of geodiversity, biodiversity, and cultural diversity in this region. Management of supervision and development of the geoheritage potential is carried out by integrating the principles of conservation, education and socio-economic empowerment of the community in a sustainable manner (Komoo, 2000).

Geotourism potential specifically is a tourism activity that raises the panoramic and geological aspects of its own attraction (Kubal\'\iková, 2013). Geotourism is part of nature tourism or ecotourism, with geology and landscape as its main focus (Ross K Dowling, 2011). Geotourism is also an attempt at geodiversity conservation through learning and appreciation (Ross K Dowling, 2011). The scope of geotourism is a combination of landforms or shapes of outcrops, attractions, and geological processes that occur in a geosite. A geosite can be a landscape, a group of landforms, a single landform, rock outcrops, fossil beds or fossils. Other phenomena such as unique flora and fauna, buildings, and cultural elements in the local geosite environment can be used as added values of a geosite. In addition, geotourism can also provide education to the community about the impact and importance of geology for everyday human life (Ross Kingston Dowling & Newsome, 2006).

The role of surrounding local communities in developing geotourism is very important. Geotourism development is expected to increase village development, and to open employment opportunities so it can improve the economy of the local community (Cengiz et al., 2011). Geoturism is also important for sustainability of culture, tradition, and custom (Lutfianti, 2017).

The Jatibungkus geosite area is located in the northen Karangsambung – Karangbolong National Geopark (GNKK). The existence of Jatibungkus geosite as an isolated hill with a unique series of caves has the potential as a destination for geotourism. This Jatibungkus Geosite has been managed by the Pokdarwis (Kelompok Sadar Wisata) of Langse Village, but it is been inactive and has not yet been integrated with several other geosites located nearby in Karangsambung District.

This research was conducted to improve the economical value of geoturism as an alternative livelihood of local people in Jatibungkus through geosite development. The assessment of the potential of the Jatibungkus geosite area done by using geosite and geomorphosite analysis by Kubal\'\iková (2013). The results of this analysis are used as the basis for create the master plan of the Jatibungkus geotrail line that integrates the visual

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uniqueness of the cave with the structural morphology of the hills and other geosites especially in the northern Karangsambung - Karangbolong National Geopark area.

2 Research Area and Methods

This study uses four methods, regional geological studies, field research, geosite and geomorphic assessment analysis, and planning the geo track system inside and outside around the geosite. Regional geological studies are carried out at the beginning to determine the regional geological conditions of the study area. Some of previous geological studies in this area have been carried out by several authors (Asikin, S., Handoyo, A., Busono, H., dan Gafoer, 1992; Asikin, 1974; Bemmelen, 1949; Hall, 2012; Harsolumakso, 1995; Paltrinieri & Sri Sajekti, 1976). The seconds methods are followed by primary field data collection in Jatibungkus Geosite and surrounding area. The third methods relate to the assessment of several parameters of geosite and geomorphosite analysis based on geotourism quantification methods according to Kubalikova, 2013, as shown in Table 1 (Kubal\'\iková, 2013). This assessment method was used in several geosite in other place, for example in East Kalimantan (Hidayat et al., 2017). This analysis includes several assessment parameters, such as the scientific and intrinsic values, educational values, economical values, conservation values and added value (beauty, culture, geological factors) in certain regions. The last methods relate to the creation of the Jatibungkus geotrail path master plan that integrates with other geosite potentials around it based on the results of geosite and geomorphosite analysis. In some geotourism locations, geotrail has been proven to increase the potential of geotourism in some of these areas (Ginting & Siregar, 2018; Norrish et al., 2014). Geotrail lines made as a suggestion for further development of this area. It is expected that it can increase the potential of geotourism in this area.

Table 1: Geosite and Geomorphosite Assessment

No	Criteria	Values			
		Area Gua Silodong - Sikempul	Area Gua Langse	Embung Kalisana	Average Value
1	**Scientific and intrinsic values**				
A	Integrity	0,5	0,5	0,5	0,50
B	Rarity (number of similar sites)	0	0	0,5	0,17
C	Diversity (number of different partial features and processes within the geosite or geomorphosite)	0,5	0,5	0	0,33
D	Scientific knowledge	1	1	0	0,67
Total (%)		**50**	**50**	**25**	**41,67**
2	**Educational values**				
A	Representativeness and visibility/clarity of the features/ processes	0,5	0,5	1	0,67
B	Exemplarity, pedagogical use	1	1	0,5	0,83
C	Existing educational products	0,5	0	0	0,17
D	Actual use of a site for educational purposes (excursions, guided tours)	0,5	0,5	1	0,33
Total (%)		**62,50**	**50**	**37,50**	**50,00**
3	**Economical values**				
A	Accessibility	0,5	0	0	0,17
B	Presence of tourist infrastructure	1	1	1	1,00
C	Local products	0,5	0,5	0	0,33
Total (%)		**66,67**	**50**	**33,33**	**50,00**
4	**Conservation values**				
A	Actual threats and risks	1	1	1	1,00
B	Potential threats and risks	1	1	1	1,00
C	Current status of a site	0,5	0,5	0,5	0,50
D	Legislative protection	1	1	1	1,00
Total (%)		**87,5**	**87,5**	**87,5**	**87,5**
5	**Added values**				
A	Cultural values: presence of historical/archaeological/ religious aspects related to the site	1	0,5	0	0,50
B	Ecological values	0,5	0,5	1	0,67
C	Aesthetic values	0,5	0,25	0,25	0,33
D	Number of colours	0,25	0,25	0	0,17
E	Structure of the space, viewpoints	0,25	0,5	0,25	0,33
Total (%)		**50**	**40**	**30**	**40,00**
Total Values (%)		**63,33**	**55,50**	**42,67**	**53,83**
Average Total Values (%)			**53,83%**		

Source: Modified from Kubalikova, 2013

3 Analysis and Result

3.1 Geology of the Research Area

The research area is part of the South Serayu Mountains Zone. Van Bemmelen,1949 specifically divided the South Serayu Mountain Zone into two, the eastern and the western zones. The unique and rare Cretaceous – Paleocene bedrocks were exposed in the middle of that two zones. In particular, geodiversity in this area makes this region decent to be the one of the national geopark in Indonesia (Bemmelen, 1949).

Jatibungkus Geosite is part of the Karangsambung Formation (Asikin, 1974). This formation is composed of Paleogene sedimentary rocks formed by the collisional process of marine gravitational avalanches between Sundaland and East Java micro continental plates (Hall, 2012). This mechanism produces sedimentary mixed rock, known as the Middle Eocene – Oligocene olistostrome deposit (Asikin, 1974).

The Karangsambung Formation consists of conglomerate fragments, fossilized limestones, sandstones, basalt igneous rocks embedded in the claystone matrix (Asikin, 1974). The existence of limestones in the Karangsambung Formation is a special attraction. Jatibungkus Geosite is an isolated hills and associated with unique caves, such as Langse Cave, Sikempul Cave and Silodong Cave. This geosite potential is feasible to be further developed and synergized with other geosites around it (Figure 1).

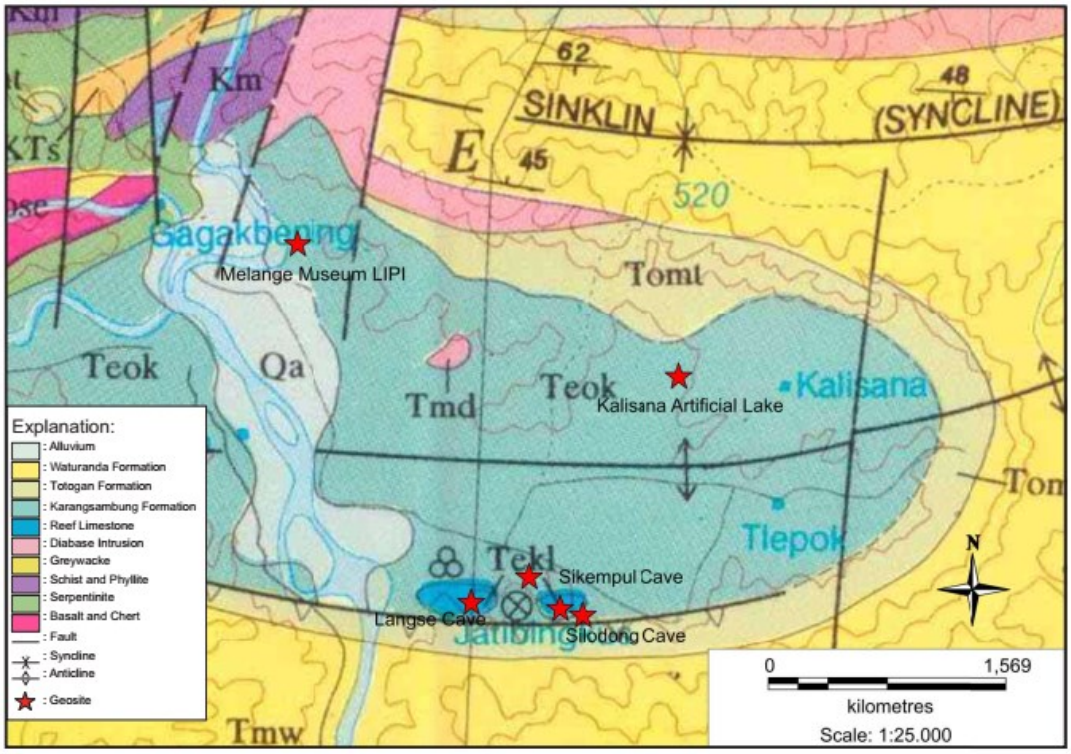

Figure 1. Geological Map of Research Area

3.2 Jatibungkus Geosite Geotrail Line

Jatibungkus Geosite is part of olisostrome Karangsambung Formation, consists of reef limestone hills that have undergone karstification and formed several karst caves therein, including Langse Cave, Silodong Cave and Sikempul Cave. These caves are located relatively close with each other and have several distinctive ornaments in the cave, including stalactites, stalagmites, and several other ornaments. The outcrop in this geosite shows the presence of planktonics and larger Foraminifera, Miliolids, corals and algae fossils (Paltrinieri & Sri Sajekti, 1976). In addition to the cave, there is also a manufacture of woven handicrafts from pandanus by local people around the geosite which can be optimized as merchandise typical from Jatibungkus Geosite.

Jatibungkus Geosite Geotrail Line is an integrated geotourism geotrail line that connects Geosite Jatibungkus with other geosite around it. This geotrail line is also connects geosites with transportation routes with public transportation, as well as other public facilities. This geotrail line shown into a map to provide guidance and overview of Jatibungkus Geosite for tourists. This Jatibungkus Geotrail Line can also be used as a special geotourism tour package. The geotrail line map can be seen in Figure 2. Here is a discussion of each geosites in the Jatibungkus Geosite complex.

3.2.1 Langse Cave

Langse Cave located in Jatibungkus Hill, Langse Village. This cave is often visited by students from various universities for field studies. There are two cave entrances at this geosite point. These caves are dead and closed

caves. On the outside of these cave, there is a limestone outcrop with quartzite fragments that are quite interesting geologically. Inside the cave there are a few stalactites, stalagmites and are mostly inhabited by bats.
The results of geosite and geomorphosite analysis in Table 1 show that Langse Cave have the scientific and intrinsic values of 50%, educational values of 50%, economical values of 50%, conservation values of 87,5%, and added value of 40%. Overall, Langse Cave has a feasibility rate of 55.50%, eligible as a geotourism object.

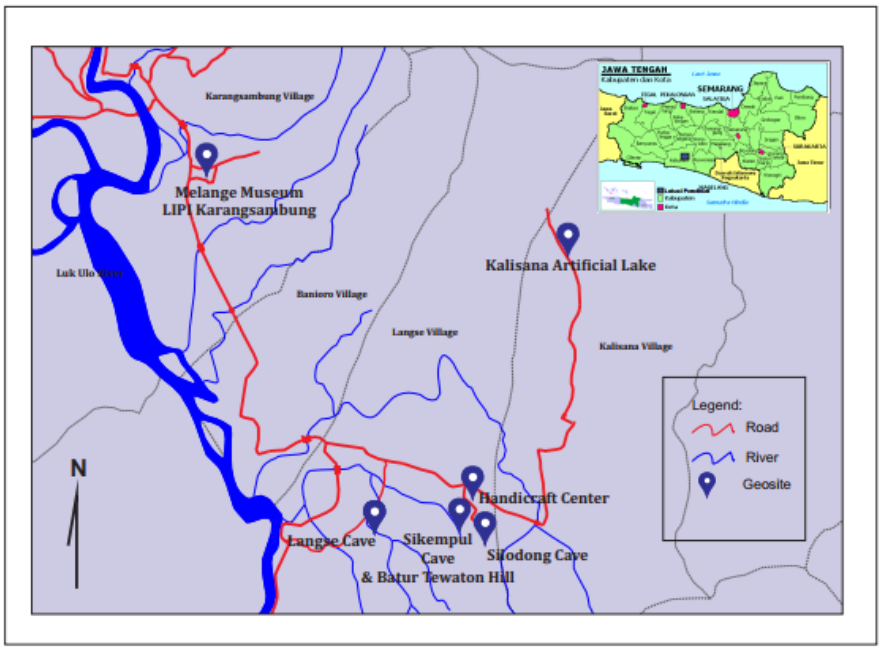

Figure 2. Geotrail Jatibungkus Geosite (not scaled)

Figure 3. Langse Cave

Figure 4. Quartzite in Langse Cave

3.2.2 Sikempul and Silodong Caves

Sikempul and Silodong Caves are located in Langse Village. These caves are located separately. These caves are dead and closed caves. Stalactites, stalagmites, and other cave ornaments are found inside the caves. The cave ornaments inside the Sikempul Cave can produce sounds like *gamelan* when hitted by stone or something. This is the main attraction of Sikempul Cave.

On the summit hill above Sikempul Cave, there is a place called Batur Tewaton. From this place can be seen the geomorphology of the hills of Melange Area on the northern Karangsambung District Area. On the outside of the silodong cave there are some interesting limestone debris. Inside the Silodong Cave there are several cave ornaments such as stalactites and stalagmites.

The results of geosite and geomorphosite analysis in Table 1 show that Sikempul and Silodong Caves have the scientific and intrinsic values of 50%, educational values of 62,50%, economical values of 66,67%, conservation values of 87,5%, and added value of 50%. Overall, Langse Cave has a feasibility rate of 63,33%, eligible as a geotourism object.

Figure 5. Welcome Sign on Sikempul and Silodong Cave

Figure 6. Ornaments inside Sikempul Cave

Figure 7. Batur Tewaton Summit

3.2.3 Merchandise Center

Near the entrance of the geosite there is a woven pandanus craft called *complong*. This woven pandanus is a specialty of the Langse Village but has not been optimal in its use. This craft can be used as merchandise and souvenirs typical of this geosite.

3.2.4 Kalisana Artificial Lake

Kalisana Artificial Lake is located in Kalisana Village, Karangsambung Subdistrict. This artificial lake is the farthest geosite in the Jatibungkus Geosite area. This is a reservoir that was made as water resources for residents around the village of Kalisana and its surroundings. Geologically, Kalisana Artificial Lake is included in the Karangsambung Formation.

The results of geosite and geomorphosite analysis in Table 1 show that Kalisana Artificial Lake have the scientific and intrinsic values of 25%, educational values of 30%, economical values of ekonomi 33,33%, conservation values of 87,5%, and added value of 50%. Overall, Kalisana Artificial Lake has a feasibility rate of 42,67%.

Figure 8. Pandanus Plant

Figure 9. Souvenirs from Pandanus

Figure 10. Kalisana Artificial Lake

4 Conclusions and Recommendation

Jatibungkus Geosite is one of the geosites inside the Karangsambung – Karangbolong National Geopark. This area is part of olisostrome in the Karangsambung Formation which contains of Middle Eocene – Oligocene rocks. Based on the geosite and geomorphosite assessment, Geosite Jatibungkus is eligible to be developed as a geotourism site with average total value 53,83%.

One of suggestions from this study that can be applied to develop the geotourism potential in this geosite is by making a geotrail line that connects the Silodong-Sikempul Cave, Batur Tewaton Hill, Langse Cave, Kalisana Artificial Lake, and Handicraft Center. This geotrail route is also connected with LIPI Melange Museum to increase the geotourism potential in this geosite.

Improvement of management supervisions (*Pokdarwis*), road repairs, infrastructure additions, and promotions in various media are very necessary for this geosite so that later this geosite can be used as an alternative livelihood for the local community around the geosite. eotourism potential in this geosite. Support from the local government, cooperation with government and private parties aare also very necessary to develop this geosite as one of the interesting geosites within the Karangsambung Karangbolong National Geopark area.

The potential of Jatibungkus Geosite as an object of geotourism is actually very high, but it still needs a lot of things to develop this site. These are several suggestions for developing the geosite potential needed:

a. Development of infrastructure, signboards and information boards, toilets, resting places, prayer rooms, etc.
b. Making tour packages and geotrail routes for tourists.
c. Making and developing craft centers and souvenirs that are interesting for tourists.
d. Repairing the road to the location.
e. Promotion/branding on social media and in other media (leaflets, banners, flyers, etc.)
f. Improving tourism management or supervision, repairing, and adding of human resources that support Jatibungkus's geosite success.

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