

DEVELOPMENT OF THE PUGUNG RAHARJO ARCHAEOLOGICAL PARK IN LAMPUNG PROVINCE WITH GEOPARK AND ASTROTURISM CONCEPT

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ABSTRACT

Pugung Raharjo Archaeological Park is an archaeological site covering a 30 hectares area in East Lampung Regency, Lampung Province. There is some evidence of the megalithic era, also called the stepped pyramid of Pugung Raharjo discovered in 1957. There are other megalithic buildings from the 12th to 16th centuries AD, including menhirs and dolmen and prehistoric remains dating back to 2500 BC. From a geological perspective, Pugung Raharjo Archaeological Park was built on the extent of vesicular basalt lava of the Sukadana Formation, which is situated above the top of the Sukadana Basalt Plateau. These stones even have a local designation referred to as 'curly stones' because of their rough texture and vesicular holes. Due to its good strength and adhesion, the people of East Lampung use this stone as their house foundation. These stone is also used to make pundan berundak, menhirs, dolmen and others. The use of local stone for buildings and daily life tools shows a strong connection between geological and cultural aspects. The Pugung Raharjo Site area is also a very suitable location for astronomical observations because of the low level of light pollution. Moreover, according to history, people have been familiar with astronomy in their daily lives, such as worship, time markers, navigation, or directions. This gives reach to a hypothesis about the possibility of this ancient society's astronomical knowledge manifested in determining each object's position in an area with specific constellation patterns. Based on its potential, Pugung Raharjo Archaeological Park is very suitable for developing the Geopark concept, which integrates geological, biological, and cultural aspects.

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1. INTRODUCTION

The Pugung Raharjo Acreological Site was discovered in 1957 by locals consisting of transmigrants during logging for plantations. Some of the transmigrants, namely Barno Raharjo, Sardi, Karjo, Kodiran, and Sawal, reported their findings to the Antiquities Service. One of the earliest discoveries was a statue known as the Bodhisattva statue, which is characterized by a period of Hindu-Buddhist influence. Many experts have disclosed megalithic traditions in Sumatra, long before Indonesia's independence, including Tombrink, Steinmetz, Ullman, Schnitger, Van der Hoop, and Funke. However, Pugung Raharjo, who was found by these transmigrants, was unknown to the researchers (BPCB Banten, 2019).

After a few years since it was discovered, in 1968, initial research was conducted by the Archaeological Institute led by Drs. Buchori. In 1973, the National Institute of Antiquities and Heritage, in collaboration with the Pennsylvania Museum University, conducted archaeological records and documentation at Pugung Raharjo. The results of the

research are stated in the Sumatra Research Report. Research continues, specifically, in 1975, the team Soekatno T.W. conducting surface mapping and survey activities (BPCB Banten, 2019).

In 1977, Haris Sukendar conducted a study that succeeded in finding and identifying several perforated and scratched stones along with the distribution of the findings. In 1980 excavations were carried out, which resulted in the conclusion that the Pugung Raharjo megalithic complex has about 25 ha. From 1977/1978 to 1983/1984, restoration was carried out at the Pugung Raharjo site by the Directorate General of Protection and Development of History and Antiquities through the Lampung Historical and Archaeological Heritage Development and Maintenance Project (BPCB Banten, 2019).

2. DATA AND METHODS

This study uses field surveys and geological mapping to identify the potential for geodiversity, biodiversity, and cultural diversity in the research area. Observation of the object of the archaeological park is carried out primary and secondary. Analysis of satellite imagery was carried out for regional and geospatial mapping of ancient site objects (**Figure 1**).

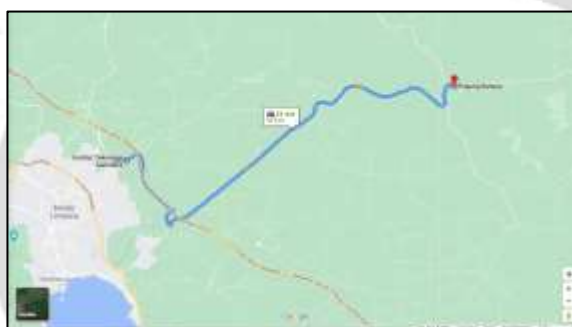


Figure 1. Map of the Pugung Raharjo Archaeological Park location from the Institut Teknologi Sumatera (ITERA) Campus, 44 km distance, from Bandar Lampung, 60 km, travel time \pm 60 minutes.

Astronomical observations using optical astronomy methods refer to the techniques used to identify and analyze light in the region around wavelengths detected by the eye (about 400 – 800 nm). The most commonly used instruments are telescopes, with CCDs and spectrographs.

3. RESULT AND DISCUSSION

1. The Latest Condition of the Pugung Raharjo Archaeological Park

The Pugung Raharjo Archaeological Park tourist attraction has excellent potential with history-based tourism and is pretty rare in Lampung Province. The advantage of this site is the natural beauty that is still maintained because it is in the middle of a rural area. Unique objects owned by this site include stepped pyramids and statues of the historical heritage of high value. From the social side, the friendliness and hospitality in the community around the object is also a potential tourist attraction.

In general, tourism development has been going well in and around the site. Accessibility to the location is quite good. From Bandar Lampung City, the location can be reached within 60 minutes. Large vehicles such as buses also access this location. However, the roads around the location are still slightly damaged, and there is no public transportation available. The available facilities and infrastructure such as parking lots, toilets, walkways, food and beverage kiosks are available, although they need to be upgraded.

There are no available lodging in this area, such as hotels, guest houses, and homestays as accommodation providers. The most visible thing is the promotion that has not been maximized, and security issues are still constrained, causing the slightest public interest to visit the Pugung Raharjo Archaeological Park, thus hampering the development of this tourist attraction (**Figure 2** and **3**).



Figure 2 & 3. Pugung Raharjo Archaeological Park Management and the condition of Pugung Raharjo Museum

The Pugung Raharjo Archaeological Park is currently managed by the Banten Cultural Heritage Preservation Center (BPCB) and the Lampung Provincial Government. Cultural heritage conservation activities have been going well by personnel who specifically work in this regard. However, skilled personnel such as archaeologists who work full time are not yet available there. Regarding tourism development, the Sekampung Udik District Pokdarwis held several discussions on program plans, but according to the manager, the program has not been implemented optimally. In education and research, this site has a museum that is used as an information center and collection storage, although there is no detailed explanation for each collection (**Figure 4 and 5**). The museum also does not have copies of scientific documents from the Balai Pelestarian head office, which are already quite numerous, some of which have been written by international researchers. The unavailability of expert personnel at the research site can slow down access to scientific information for researchers. This location also does not provide local guides who are available during working hours.



Figures 4 & 5. Information in the museum, in general, has explained several collections but has not shown more detailed and comprehensive results. The available maps and plans still use the old method style, are unattractive, and need to be adapted to current technology.

Every object in the Pugung Rahardjo Archaeological Park area has not been equipped with detailed information. Without a guide, visitors or tourists can only see visually without explanation and additional information so that the tour is only limited to selfie photography activities (**Figure 6**). Various parties have carried out comprehensive studies for each object. The site's location has provided directions for each object, although it has not been equipped with an area plan that explains the location of the visitor and where the visitor must walk (**Figure 7**).

The Pugung Raharjo site is unique, engaging, and varied in terms of chronology, artifacts, and features. The remains on this site are chronologically complete, starting from the prehistoric, classical (Hindu-Buddhist) period to the Islamic period. Artifacts found at this site include foreign ceramics from several dynasties, local ceramics, beads, dolmens, menhirs, knives, spearheads, perforated stones, whetstones, pebbles, stone axes, stone trap punden (stepped-pyramid), bronze bracelets, and scratched stone. The features found at the Pugung Raharjo site include artificial forts and moats, punden terraces, perforated stones, stone mortars, scratched stones, stone cages (corpse stone) (Audio Visual Team for Pugung Raharjo Archaeological Site Site, BPCB Banten, 2019).



Figure 6. Amenity at Pugung Raharjo Park. The information boards provided are only general descriptions; there is no explanation of the existing objects. The barcode is linked to the Ministry of Education and Culture website with general explanations.



Figure 7. Condition of the largest stepped pyramid in the Pugung Raharjo Archaeological Park. The manager well maintains the site. However, there is no specific information regarding the object

2. Geological Conditions in the Pugung Raharjo Park

From a geological perspective, the location of Pugung Raharjo Park is built on a rock unit formed from magma that comes out to the earth's surface, which is called vesicular basalt lava from the Sukadana Basalt lithology unit (Mangga, 1992). This type of rock distribution is exciting to study further because it has many differences from volcanic rocks scattered in Indonesia. These stones even have a local name called curly stone because of the rough texture of the stone and holes (**Figure 8**). The people of East Lampung use this stone as a house foundation because it has good strength and adhesion. These stones are also used in Pundan Berundak, Menhirs, Dolmen and other objects in Pugung Raharjo. The use of local stone for cultural and daily life shows a solid connection to the geological and cultural aspects. This is in line with the Geopark concept, which integrates geological, biological, and cultural aspects.



Figure 8. (Clockwise from top left) Outcrop of vesicular basalt rock of the Sukadana Formation. The vesicular basalt was used on Pugung Raharjo archaeological objects and is still used by the community today.

3. Sky Conditions at Pungung Raharjo Park

Based on the measurements from Atmospheric and Planetary Science experts, the Pugung Raharjo Archaeological Park area is in an area with low light pollution. This causes the sky seen from this area to be quite dark at

night to display celestial objects clearly (**Figure 9**). Based on this information, Pugung Raharjo is an excellent place for astronomical observations.

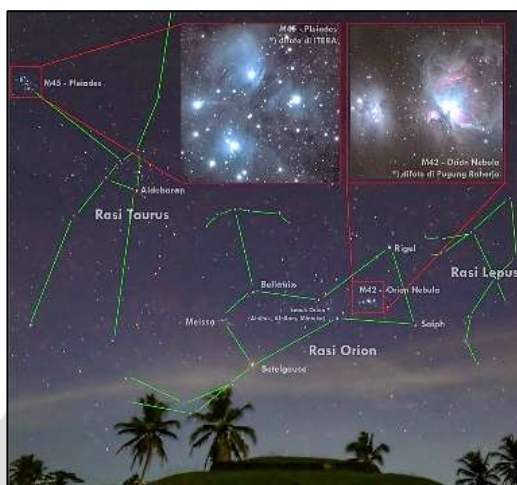


Figure 9 Appearance of the Constellations in the Pugung Raharjo Archaeological Park

4. Tourism Development in Pugung Raharjo Archaeological Park

The local community has known the Pugung Raharjo Archaeological Park Megalithic Site as a tourist place in general as it is from the results of vision without knowing the reasons. The assumption of the Pugung Raharjo Village community towards the Pugung Raharjo Archaeological Park Megalithic site as a place for history learning is 39.6%, which means that only 39.6% of the Pugung Raharjo Village community understand that Pugung Raharjo has the value of science, especially history and culture, not just visual tourism (Susanti, 2013).

This is because the Pugung Raharjo Archaeological Park Tourism Object manager has never disseminated information through advertising, films, brochures, manuals, posters, and the Pugung Raharjo Archaeological Park Tourism Object manager has also never carried out any promotions or promotions. Information through various mass media channels such as newspapers, cinema, radio, TV, and mail delivery. Pugung Raharjo Archaeological Park Tourism Object, East Lampung Regency (Susanti, 2013).

As an archaeological site with high educational value, Pugung Raharjo Archaeological Park still does not provide a library or collection of scientific documents related to objects. All scientific information is still stored in the office of the Banten Cultural Heritage Preservation Center in Serang, Banten Province. This condition can undoubtedly hamper research and education activities carried out at the location.

The development of tourism and culture in the Pugung Raharjo Archaeological Park is fluctuating. Interest in public visits to this site is also stagnant. The site manager admits that he is experiencing difficulties in increasing tourism because the main task and function of the hall is actually in the field of cultural conservation. Meanwhile, in tourism, other partners are needed, such as community tourism activists and/or professionals who are focused on promoting and innovating tourism activities.

Discussion and Recommendation

Currently, astronomical observation activities are no longer segmented among experts but can also be enjoyed by the general public through Astro-tourism. According to the Director of "Dark Sky International," Astrotourism is any tourism that involves the night sky or visiting astronomy-related facilities such as observatories and combines it with the broader notion of ecotourism where interaction with nature is a visitor experience (Pásková, 2021). In this program, the broader concept of ecotourism will be developed into Geotourism, where geological aspects and geographical characteristics have an essential role in the substance of tourism development. Astronomy in Astrotourism is not limited to celestial bodies but develops towards astrology, archaeoastronomy (astronomy in the history of human civilization), ethnoastronomy (astronomy in human life today), to the history of astronomy itself.

In the history of the Indonesian archipelago, people have understood and used astronomy in everyday life (Marsono, 2008). Classical Hindu-Buddhist sites such as Prambanan and Borobudur were built based on these astronomical calculations. Traditional ceremonies, rituals, timing of planting and harvesting also take advantage of astronomical time readings in various archipelago regions. Seeing this perspective, the programming team tried to mix and match astronomical concepts at the Pugung Raharjo Archaeological Park, with the hypothesis that objects in this location might be built using an astronomical approach (**Figure 10**). Even if this hypothesis is incorrect, at least the Pugung Raharjo Archaeological Park has been proven to be an excellent astronomical observation point and has the potential to become an Astrotourism destination.



Figure 10. Astro-camp activities at the Pugung Raharjo Archaeological Park

Potential of Geopark Concept Development

The understanding of managers and the public, regarding the potential of geotourism, astrotourism, also cultural tourism has not yet been socialized. Later all the potential diversity of geo-bio-culture elements will be mixed and matched in a geopark tourism concept.

Definition of Geopark: Geopark is a single or combined geographic area, which has a Geological Heritage Site (Geosite) and valuable landscapes, related to aspects of Geological Heritage (Geoheritage), Geological Diversity (Geodiversity), Biodiversity (Biodiversity), and Diversity Culture (Cultural Diversity), and managed for conservation, education, and sustainable community economic development with the active involvement of the community and local government, so that it can be used to foster public understanding and concern for the earth and the surrounding environment (Presidential Decree No. 9/2019).

In connection with the plan to develop a geopark concept in Lampung Province, namely the initiation of the Krakatoa-Way Kambas Geopark from the Lampung Provincial Government, which covers one city and three districts (Bandar Lampung City, South Lampung, East Lampung, and Pesawaran), the Pugung Archaeological Park Raharjo, which is located in East Lampung, has the potential to be part of the Geopark area. The object of interest in a geopark is called a 'geosite'. Geosites in geoparks can represent geological, biological, and cultural diversity. In this case, Pugung Raharjo can represent cultural diversity which is also related to geological and biological conditions (Figure 11). Geosites in East Lampung include Bukit Granite Indah, Pugung Raharjo Archaeological Park, Pandan Cave, and Way Kambas National Park, which will later be integrated into the theme of **East Lampung Cultural Landscape**.

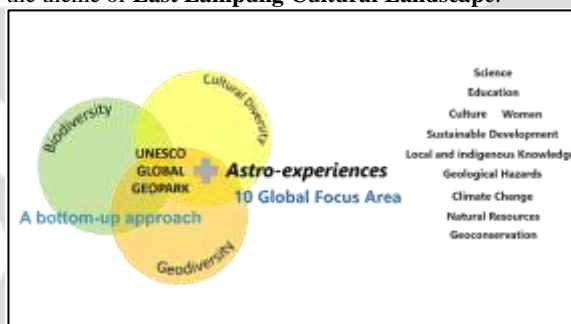


Figure 11. Geopark concept diagram that shows geological, biological and cultural diversity is explored as an object of regional development, coupled with astro-experience

The study results and inventory of existing geological, biological, cultural, and astronomical scientific information will be socialized and consolidated with managers and the community around the site in the form of presentations and Forum Group Discussions. Archives of scientific documents or academic manuscripts stored in the Banten Cultural Heritage Preservation Center office will be dug more profound. A copying permit is requested to be stored at the Information Center in Lampung as a mini library and database.

To disseminate educational information to visitors and the public, it will also create information boards at several important object points in the area. In addition, information centers located outside the area will also be equipped with leaflets and brochures (Figure 12).



Figure 12. Visual example of an interpretation board that can be installed on the stepped pyramid object.

4. CONCLUSION

The Pugung Raharjo Archaeological Park is an archaeological site in Lampung Province and, at the same time, a leading tourism destination. This location has evidence of nationally significant archaeological heritage in the form of terraced punden, menhirs, and so on. The object has a relationship with the geological conditions of the surrounding area, namely the use of basalt, which is the lithology that makes up the area as the raw material for punden terraces and menhirs. Pugung Raharjo also has the potential to become a sky observation point because of its low light pollution. Based on its potential, Pugung Raharjo Archaeological Park is very suitable for developing a geopark concept that integrates aspects of geology, biology, culture and is combined with astronomy in the form of astrotourism.

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