



THE HOPE PRESERVATION OF GEODIVERSITY AND CULTURE OF MERANGIN JAMBI FOR GEOTOURISM DEVELOPMENT IN AIR BATU VILLAGE

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Article Info	Abstract
<p>Article history:</p> <p>Received : Nov 28, 2023 Revised : Dec 05, 2023 Accepted : Dec 22, 2023</p>	<p>Jambi is rich in natural resources, but face climate change risks such as rising temperatures, changes in rainfall, and sea level rise. Despite its geological wealth and cultural heritage, tourism in Jambi, especially in the Merangin Geopark area, is still undeveloped due to inadequate facilities and infrastructure. The area has a variety of geological potentials in the Merangin Geopark, highlighting geological wonders and fossils dating back 300 million years. The purpose of this study is to describe the development of the Merangin Geopark and the conservation management of fossil "Jambi Flora" along the Merangin River. Air Batu Village in the Merangin Geopark is an example of local wisdom initiated by the local community, establishing local economic growth with cultural preservation. Its residents depend on agriculture while striving to improve their livelihoods. The geological and cultural diversity of the area, represented by ancient fossils and traditional structures, such as historic wooden houses and the Baitul Ikhsan mosque, is of substantial value. However, disaster management regarding these heritage sites remains fragmented. Efforts toward preservation include the maintenance of biodiversity, ecosystems, and cultural artifacts. Such conservation practices aim to protect and extend the life of these precious resources, especially rare and precious collections in libraries and museums</p> <p>Keywords: Geopark, Geodiversity, Jambi Flora Fossil, Merangin</p>

1. INTRODUCTION

Geotourism as a form of sustainable tourism based on geological resources, providing information, satisfaction for tourists, and environmentally friendly [1]. Geotourism is also known as geological tourism that explores geological phenomena, tourism, and landscapes and sets tourism strategies and agendas [2]. Geotourism is born from tourist dissatisfaction with the type of tourism that has developed (Mowforth & Munt, 2015). Changes in tourist interest are evident from the large amount of natural resource-based sustainable tourism (Thao & Trang, 2018). Geotourism has become a global phenomenon since 2000 [3], and currently many countries are paying attention to Geotourism in Indonesia [4]Indonesia has great potential in the field of Geopark. Geopark development efforts in Indonesia began in 2008, with the preparation of the

Rinjani Lombok Geopark as a member of the Global Geopark Network (GGN). In 2012, Gunung Batur Geopark became part of GGN, followed by Gunung Sewu Geopark in 2015. In the same year, the government designated four Geoparks as National Geoparks, namely Toba Caldera National Geopark (North Sumatra), Merangin National Geopark (Jambi), Rinjani Lombok Geopark (West Nusa Tenggara), and Ciletuh Palabuhanratu National Geopark (West Java) [5].

UNESCO defines Geopark as a geographical area that manages sites and landscapes with international geological significance value based on the concepts of protection, education, and sustainable development [6]. Geopark is not only about geological diversity, but also about excavating and developing the relationship between geological diversity with natural and cultural resources [7]. Geopark development integrates geological, natural resource, and cultural diversity with the goal of increasing awareness and understanding of how Earth's 4.6 billion years of history of formation shaped every aspect of life and social society.

Then, we explore the definition of Geopark through several aspects [8]. Geopark is an area that contains various types of geological elements as natural heritage. Here, various regional development strategies supported by government programs can be applied. Geopark has geological sites that have meaning in terms of knowledge, uniqueness, beauty, and education. This site is part of the Earth's heritage that needs to be protected. Geopark development zones have opportunities to create economic value and manage the local economy through nature-based tourism or geotourism. Sustainable Geopark management is balanced with economic activities within the area (through tourism) with conservation efforts. Geoparks involve active community participation in overall regional revitalization. Geoparks are also a testing ground for science and technology in protecting natural heritage. Geoparks have various important functions for the survival of the Earth. Geopark is a single or combined geographical area that has geological heritage sites (geosites) and valuable landscapes, related to aspects of geological heritage, geological diversity, biodiversity, and cultural diversity.

2. RESEARCH METHOD

The qualitative methodology was used in this research. The research highlighted the preservation of Merangin Jambi geodiversity and culture for the development of geotourism at Air Batu Village based on the findings from various studies and through field observation and visit. The study by [9] highlights the role of social and cultural media in community participation, which can be applied to engage the local community in the preservation efforts. The study by [10] emphasizes the positive impacts of tourism development, such as infrastructure improvement and increased income, which can be considered in the planning process. Additionally, [11] discuss the development of Branjang tourist village as a leading tourist attraction, which can serve as a model for the development of Air Batu Village. Finally, the study by [12] showcases the potential of geodiversity in the Krayan Highland, which can inspire the preservation and promotion of Merangin Jambi geodiversity. By integrating these insights, a comprehensive methodology can be formulated to preserve the geodiversity and culture of Air Batu Village for geotourism development.

3. RESULTS AND ANALYSIS

Jambi is one place that meets the exposure above. Jambi Province is an area that has extensive and abundant biological resources and is located in a strategic position. Jambi Province is geographically located at $0^{\circ} 45' 3''$ South Latitude and $101^{\circ} 0' - 104^{\circ} 55'$ East Longitude in the central part of Sumatra Island with a land area of 50,160.05 km² and a water area of 425.50

km². The northern part of Jambi Province is bordered by Riau Province, to the east by the South China Sea and Riau Islands Province, to the south by South Sumatra Province, and to the west by the Provinces of West Sumatra and Bengkulu. Jambi Province has a tropical climate and is rich in natural resources and biodiversity, but also remains vulnerable to climate change. Symptoms of climate change such as temperature increases, changes in rainfall intensity and period, shifts in the rainy/dry season, and sea level rise, will threaten the environmental carrying capacity and activities of all development sectors. Jambi located in Southern part of Sumatra, is part of the base rock of Sumatra Paleozoic age. The shape and configuration of the area reflects a long process of interaction between the forces of endogenous and exogenous, which distributes the potential mineral resources, energy, and disaster. The tectonic process leave traces in the form of changes landscapes, fossils, rocks and other geological aspects that have historical and scientific value. Geosites and culture in the Jambi Province become an attraction and resources for tourism in the area. At 2012, through the Decree of the Head of Geological Agency No.130k/04/BGL/2012.

Merangin Jambi Geopark has an area that includes the Merangin paleobotany park, the Kerinci highland park, the Sarolangun geo-culture park and the Thirty Mountains Gondawa Park, but the tourism potential has not been managed optimally [13]. The development of Geopark Merangin Jambi geotourism is still very low, this is evidenced by the low number of tourists coming to Jambi, the number of tourists coming to Jambi is still between 2000-4000 tourists throughout 2003 to 2016, so efforts are needed in developing eco-geotourism Geopark Merangin Jambi. The low number of tourists at Geopark Merangin Jambi is caused by poor facilities and infrastructure at Geopark Merangin Jambi [14] such as limited access to locations, no internet access, non-standardized homestays, toilets which are still limited to river areas. The potential for an earth park that can be developed can be seen in table 1.

Table 1. Potential of Merangin Jambi Geopark

No	Coordinates	Descriptions
1	020 33' 56.5" S 1010 49' 42.0" E	Lake Pauh and Danau Kecil are next to each other, present as a type of maar lake due to phreatic eruptions that are predicted to be at least three times marked by the presence of three rock groups.
2	020 29' 53.7" S 1010 51' 21.1" E	Kumbang Lake and Drunk Lake which are located at the foot of Mount Masurai (2,980 masl) as a product of pull-apart tectonic activity that causes the subsidence of Quaternary volcanic rocks (volcano-tectonics)
3	020 17' 13.3" S 1020 18' 59" E	Fossils of fusulinids were found in the Mati River area within limestone belonging to the Batu Member of the Telukwang Formation
4	020 15' 17.3" S 1020 12' 59.0" E	Brecciated and faulted rocks, slate and meta-siltstones with embedded lens/boudinage of deformed and eroded meta-sandstone, and fault contacts between the Asai Formation and the Merangin Group near Renahmangus, Tembesi Sungai
5	020 10' 39,9" S 1020 08' 02.0" E	Altered granite-granodiorite, reddish granodiorite xenoliths found along the Merangin river basin, and basalt xenoliths occur in granite-granodiorite as an indication of granitic rock intrusion into older basaltic rocks. Locally, fractures and joints are sometimes filled

No	Coordinates	Descriptions
		with reddish quartz veins. There is also a waterfall (height: ~ 1m) indicating that there is an error on this site
6	020 10' 44.1" S 1020 10' 47.7" E	Coarse conglomerate sandstone and conglomerate in the Mengkarang Formation as a continuation of the Telukwang Formation with the same composition
7	020 10' 48.0" S 1020 10' 37.9" E	Cast of Ammonite, Brachiopods, Crinoidea, Pecopteris sp., and tree trunk fragments embedded in tuffaceous black shale in Menkarang Formation
8	020 09' 05,5" S 1020 10' 33.1" E	Polymictic conglomerate, conglomerate sandstone, and andesitic-basaltic lava flow intercalation in the Telukwang Formation. The conglomerate consists of various materials (volcanic rock - basalt and trachyte locally intersected with dacite tuff, shale, fine sandstone and granite measuring 0.25 to 20 cm), gray-green in color, and silicate.

Source: [15]

In the table above, it can be seen that the geotourism potential of the Merangin Geopark Jambi in terms of geological diversity, pauh lakes and small lakes that are opposite each other, beetle lakes and drunk lakes, fusulindid fossils in the Lati river area, brecciated and fultid rocks, granite granodiorite to conglomerates not only provide panoramic beauty of nature but save knowledge for geological researchers [15]. Jambi Merangin Geopark is a geological heritage which has a unique geology sites, one of them is the plant fossil dating to 300 million years ago and also the area is rich in cultural heritage. Air Batu village is in the Merangin geopark located in the Merangin Regency (Segment of Merangin Paleobotany Park). The main geological diversity on the Merangin River which has geoheritage values is fossil fauna flora that can act as a booster to build a geopark. While other geological diversity such as wood fossils, geological structures, landscapes and others can act as supporters including local biological and cultural diversity. The Paleobotani Park Merangin area is the core area whose entirely in the southern part of Merangin Regency especially on the banks and the river flow of Merangin and the road is written. The oldest fossils found aged \pm 300 million years in the form of fossil cordaids, calamites, pecoptired, taeniopteris sp, gigantopteris sp, sphenopteris sp and araucarioxylon (latin scientific name from planting plants). In addition, this area also has several high-value geodiversity potential to be developed into a geological heritage site. The location is close to several Geoheritage objects of natural attractions such as Goa and international standard Arum Rafting Adventures [13].

The phenomenal discovery of the "Jambi Flora" fossil in the Merangin River and several other rivers in Merangin Regency became the basis for the name Merangin [14], [16]–[18]. The "Jambi Flora" contains Cathaysian and Euramerican floral components ([19][20][21] as well as recent research suggesting the possible presence of Gondwanan elements in this region (van Waveren en van Konijnburg-van Cittered, in preparation). Air Batu Village as part of the geopark has a conservation and education approach that is in line with local economic growth which involves the active participation of local communities in the regional development process.

Air Batu Village is located in Renah Pembarap District, Merangin Regency, Jambi Province, with a distance of around 30 km from Bangko City (Regency Capital) which can be reached in 30-40 minutes by two-wheeled or four-wheeled vehicle. Administratively, Air Batu Village consists

of 4 hamlets, namely Batu Gajah Hamlet, New Mosque, Liku Harapan, and Air Batu. The topography of Air Batu Village tends to be hilly in the southern part of the village, while in the north and west it is slightly wavy. Flat topography is found in the eastern part of the village. To the west of Air Batu Village, the Merangin River flows. The settlement pattern in Air Batu Village is elongated, following the village road. Air Batu Village is inhabited by around 2464 people consisting of 640 families. The majority of Air Batu Village residents depend on plantations for their livelihoods (98%), such as rubber, oil palm, duku, durian and cinnamon. The remainder, around 2%, are looking for a living outside the plantation, such as trading and becoming civil servants [13].

Air Batu Village is a place where biodiversity and cultural heritage are located in an area of 1,551 km² as the core area located in the southern part of Merangin Regency, especially along and in the floodplains of the Merangin and Mengkarang Rivers. The oldest known fossils for ± 300 million years consist of *Cordaite*, *Calamites*, *Pecopteris*, *Taeniopteris* sp., *Gigantopteris* sp., *Sphenopteris* sp., *Araucarioxylon*, and *fusulinids*. These sites become part of geotourism where cultural heritage sites are also found in the area. *Araucarioxylon* wood fossils were found on the banks of the Merangin River in a growing position with clear roots and stems with a height of about ± 2.40 m from the roots, and a diameter of about ± 1.60 m. This wood fossil is one of the icons of the Jambi Merangin Geopark, as well as the fossil leaves of *Cordaite* sp. and some pieces of wood that became stone. Other fossils are *Macraethopterids*, *Pecopterids*, and *Cordaite*. In Situ Stumps tree fossils in their infancy, grew in swamps which were later maintained by the silicification process revealed along the banks of the Merangin River in the Karing River basin. Some of the stump fossils can be recognized as *Calamites* Tree fossils that are highly susceptible to erosion by the Merangin River and prone to lightning flooding as water from the river passes through the area. In the rainy season, river water tends to flood, while in the dry season, river water becomes shallow. The tropical climate of the Jambi Merangin Geopark area has a fairly high vulnerability to climate change. Climate change symptoms such as rising temperatures, changes in rainfall intensity and period, dry season shifts, and sea level rise, will threaten the environmental capacity and activities of all development sectors.

Jambi people still uphold their community values based on preservation inherited by their ancestors. Togetherness and a sense of family in the surrounding community with a culture of mutual cooperation are maintained. There is a strong desire from the people to change for a better life without violating their traditional customs. Geosite and cultural heritage management is based on policies that are decentralized, integrated, participatory, and involve active and visible participation of the community.

One of the cultural heritages in Jambi Merangin Geopark is old buildings (more than a hundred years old) which according to regulations are classified as cultural heritage. These buildings are scattered in several districts, for example in Merangin District (Air Batu Village and Biuku Tanjung Village) with poles made of kulim trees (*Scorodocarpus borneensis*) with a length of 12 meters and a diameter of 20 centimeters. The walls are made of wooden boards with carved decorations. The old buildings in Merangin District (Air Batu Village and Biuku Tanjung Village) are classic wooden stilt houses believed to be tens to hundreds of years old. A distinctive feature of wooden stilt houses is the decoration of carvings and paintings on the walls. Some houses have decorative ceilings or roofs made of leaf boards. There is also an old house without nails where the connection structure uses juke. The walls and floors in the house are made of bamboo. Another old building besides the wooden stilt house in Air Batu Village is the ancient mosque "Baitul Ikhsan". People tend to believe that strong prayers take place when they worship in Baitul Ikhsan that show the cultural and historical values of the mosque.

One of the old houses in Air Batu Village has artifacts such as spears, gongs, and Long Hair (wigs). These artifacts were stored on the roof of the house and wrapped in cloth. A ritual ceremony is required before showing the artifact which involves the sacrifice of an animal, usually a goat. The artifacts are kept in the house of the village chief or deputy. Most residents of Air Batu believe that the artifact has 'foretelling power'. When a disaster is about to occur in Stone Water, a sacred gong will sound. Mysteriously, the sound would not be heard by anyone living near the house where the gong was kept. The sound will be heard by villagers who live far away from the house where the gong is kept. According to villagers, the last holy gong was heard in 1995 before the earthquake. Earthquake occurs almost every year in Merangin Jambi with a Richter scale range of 3.0 to 7.0. On December 3, 2016, there was a magnitude 3.8 earthquake, on September 22, 2015 a magnitude 5.1 earthquake, and the most destructive earthquake was magnitude 7.0 on October 1, 2009, in which 80% of people's homes were destroyed, more than 500 people had to be evacuated, and 51 people were injured. Disaster management of geoheritage and cultural heritage in Air Batu Village has not been integrated. Each site has its own management and still has to work together to better mitigate its impact through more structured programs and monitoring.

In this context, of course, we need ways that are able to make culture sustainable and maintain biodiversity in an effort to develop geodiversity and protect the environment from natural disasters. This effort is then related to the process of preservation and conservation, but in more detail the author will only discuss preservation. The author has also conducted similar research but with different objects including research based on local wisdom. This research was conducted at the Bandar Cimanuk Indramayu Museum, where the author focused on the preventive and curative preservation of lontar manuscripts. This study uses a qualitative approach through descriptive research methods. Based on the results of the research, Bandar Cimanuk Museum has carried out the preservation of Sheikh Abdul Manan's ancient manuscripts through activities limiting visitor access to original manuscripts, routine cleaning of manuscripts and museum environments, fumigation, and digitization. The entire process of preservation activities is carried out in a structured and planned manner. The study concludes that the importance of museum preservation is to preserve and maintain the heritage of ancient manuscripts so that they can be accessed and utilized by the wider community [22].

Preservation is the process and work in the context of physical protection of archives against damage or damaging elements and restoration / repair of damaged archives, caused by factors from within (intrinsic) the archive itself and factors from outside the physical archive itself (extrinsic) (Fatmawati, 2018). In this case, conservation activities are efforts to maintain and maintain biodiversity and ecosystems both inside and outside their habitat so that their existence does not become extinct, remains balanced and dynamic in their development. The scope of preservation is broad; hence preservation can include maintenance, maintenance, repair, and reproduction activities. Thus, it can be said that the purpose of the term preservation is to ensure that the library materials managed are not easily damaged and can last a long time. This activity is very attached to expensive collections and rare collections

4. CONCLUSION

Jambi Province stands as a treasure trove in the heart of Sumatra, boasting vast biological wealth in a strategically positioned geographical setting. Covering an area of 50,160.05 km² on land and 425.50 km² in water, Jambi's diverse ecosystem faces vulnerability amid splendor. Climate change signals—rising temperatures, changing rainfall, and shifting seasons—jeopardize environmental sustainability and its development activities across sectors. Geographically

entrenched in the southern expanse of Sumatra, Jambi is emblematic of the island's Paleozoic base. Its intricate landscape, shaped by enduring endogenous and exogenous forces, houses a tapestry of mineral wealth, energy, and geological remains. These traces, reflected in landscapes, fossils, and rock formations, tell a story of historical and scientific significance.

Jambi's geological wealth gave birth to the Merangin Jambi Geopark—a nature that includes palaeobotanical wonders, highland spectacles, cultural treasures, and majestic mountainous nature. Despite its allure, tourism development in this paradise has not reached its peak due to limited infrastructure and inadequate facilities. Highlighting the potential within the Merangin Jambi Geopark, this table depicts the residential coordinates of geological wonders—lake Pauh, volcanic remains, fusulinid fossils, fault rocks, and more. These sites are not only captivating with their natural splendor but also serve as repositories of knowledge for geology enthusiasts.

Deep within this geological treasure is the Merangin Paleobotany Park, a time capsule that is 300 million years old. Ancient fossils, *Cordaites*, *Calamites*, and more, in addition to a rich cultural heritage, are essential in building geoparks. These relics, including wood fossils, geological formations, and local diversity, stand as invaluable assets. Located in this splendor is the village of Air Batu—the cradle of conservation and education, reflecting the growth of the local economy. Its rural setting, home to about 2,464 residents, thrives on farmland, especially rubber, oil palm, and fruit cultivation. The village preserves geological and cultural heritage, featuring ancient structures and artifacts that weave stories of history and spirituality.

The synergy between conservation efforts and biodiversity conservation in Jambi remains an important aspect of sustainable cultural growth. Local wisdom nurtures a community-based ethos that upholds tradition while striving for progress. Integrating disaster management into the protection of geological and cultural heritage requires collaborative efforts and structured programs.

In this effort, preservation is emerging as key in safeguarding biodiversity and ecosystems, ensuring the resilience of invaluable resources. By embracing preventive and curative measures, Jambi aims to preserve its natural and cultural heritage, enabling wider access and appreciation for generations to come.

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