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Analysis of the Assessment of Geo-Tourism Potential as Added Economic Value and Attractiveness of Pampang Cultural Village, Samarinda, East Kalimantan

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ABSTRACT
Geotourism is a tourism activity towards panorama and geology, which can be of a conservation nature with the types of natural resources of a region in order to develop insight and understanding of the process of phenomena that occur in nature as a driver of the regional and national economy. Pampang Village is a tourist destination and center of social and cultural activities, which is often used for traditional events. Enjoying Pampang is not only enough through its cultural attractions, Pampang has several charms that are not yet widely known, namely the Pampang River, and the exotic Pampang waterfall. Therefore, based on the potential of geotourism in the form of geological objects and supported by natural beauty, the research area can be developed into a geotourism area. This research method is carried out in three stages, namely a literature review on geotourism, a survey of geotourism locations, initial observations of geotourism that have the feasibility to be assessed as an economic factor and geoheritage. In the qualitative assessment using 4 types of assessments that will then be applied, namely the assessment of scientific values, assessment of educational values, assessment of tourism values, assessment of degradation risk values. Based on the results of data analysis conducted on each geosite that shows the feasibility as a medium class geotourism. In the assessment of science values, the Pampang River geosite received a weighting of 58.75% and Pampang Waterfall 58.75%. For educational values, the Pampang River received a weighting of 45% and Pampang Waterfall 47.5%. For tourism values, the Pampang River received a weighting of 35% and Pampang Waterfall 37.5%. For degradation risk values, the Pampang River received a weighting of 78.75% and Pampang Waterfall 78.75%. The total weighting for each geosite was categorized as moderate with a weighting of 217.5, and the Pampang River waterfall received a weighting of 220.5.

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INTRODUCTION

Geotourism is a tourism activity that specifically focuses on panoramic and geological aspects (Downling 2013). Geotourism can also be called sustainable tourism, which is conservation-

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oriented, related to the types of natural resources in a region, in order to develop insight and understanding of the processes of natural phenomena, as well as driving the regional and national economy.

The research area is located in Pampang Village, precisely on Jl. Wisata Budaya Pampang, Pampang Cultural Village, North Samarinda District, Samarinda City, East Kalimantan. The research area has geotourism potential in the form of a very exotic river and waterfall, which until now has remained under-explored by the public.

Enjoying Pampang is not enough to just explore its cultural attractions. The Pampang indigenous community has several lesser-known charms, namely the Pampang River and the exotic Pampang Waterfall. This natural river has three waterfalls, numerous springs, and a large natural pool. The Pampang River is flanked by beautiful cliffs that juxtapose together to form a tunnel, resembling the Grand Canyon. There is a waterfall at the headwaters of the Pampang River, which has three small tiers, all surrounded by natural pools with depths ranging from 1 to 5 meters. The waterfall exhibits a geological structure in the form of fractures, with sandstone lithology.

Therefore, based on the potential for geotourism in the form of geological objects, coupled with its natural beauty, the research area can be developed into a geotourism destination. The area remains rarely highlighted for its natural beauty, yet its natural beauty has economic value, as further exploration could yield attractions with the potential to become a tourist attraction. Therefore, an assessment of the research area was conducted to inform geotourism development strategies in the area.

The research area is located in the Kutai Basin, one of the largest sedimentary basins in Indonesia. This basin formed during the Tertiary period with very thick sedimentary deposits from the Eocene to the Pliocene. Geologically, the Samarinda area and its surroundings are dominated by sedimentary rocks, such as sandstone, shale, coal, and conglomerate, which are part of the Balikpapan Formation and the Kampung Baru Formation. These rocks were deposited by river activity and deltaic environments that developed during the Tertiary Period and are the primary source of coal in the region. Samarinda's geological structure is also influenced by several major faults, such as the Samarinda Fault and the Balikpapan Fault, which significantly contribute to the area's rock deformation patterns (Sunarto 2006). Tectonic activity from the Miocene to the Pliocene has resulted in the formation of folds and faults that enrich the area's coal and hydrocarbon resources (Witts 2011).

METHOD

The research methods applied in this study are divided into several stages, including:

1. A literature review of the geotourism area in question or similar literature is conducted. This aims to gain an understanding and study data from previous researchers, thus obtaining a general overview of what has been studied and concluded.
2. A geotourism site survey is conducted. This activity involves going directly to the field to collect evidence based on preliminary assumptions and to support problem-solving.

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3. A preliminary review is conducted, which aims to ensure that the potential geotourism area is worthy of being assessed for economic and geoheritage factors. This assessment is based on the technical guidelines for assessing geological heritage resources issued by the Survey Center of the Geological and Geosciences Agency (2017). Four types of assessments will be applied: 1. Scientific value assessment, 2. Educational assessment, 3. Tourism and degradation risk assessment. This aims to assess the scientific values of the research location, which are then classified based on the total weighting of each assessment and categorize the research location's suitability.

There are 3 classes of the total weight, namely a value of <200 indicates a low scientific assessment, 201 – 300 a moderate scientific assessment, and 301 – 400 for a good scientific assessment.

RESULTS AND DISCCUSION

Research Location

Observations were conducted at this location on Pampang Cultural Tourism Street, Pampang Cultural Village, North Samarinda District, Samarinda City, East Kalimantan, with coordinates X: 522672 Y: 9962723 (Pampang River Tourism), X: 522373 Y: 9962964 (Pampang Waterfall), X: 527014 Y: 9961169 (Traditional Lamin of Pampang Cultural Village).

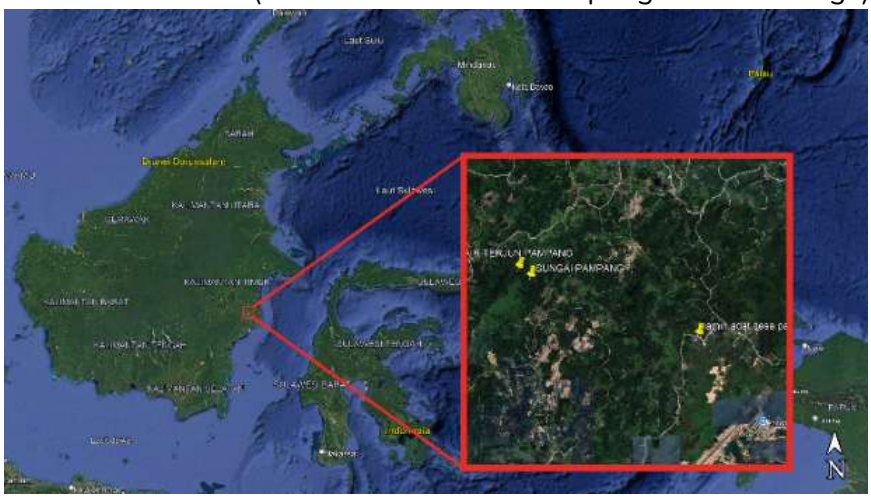

Figure 2. Research Location

Geotrack

The observation location was at the Pampang Cultural Tourism Area, Pampang Cultural Village, North Samarinda District, Samarinda City, East Kalimantan. The research site is located approximately 700 meters from the residential area. The Pampang River and Pampang Waterfall tourism area provides a view along the Pampang River to the waterfall. Along the river, scattered reef limestone is found. The Pampang Waterfall is adjacent to the Berambai Waterfall, which is dominated by sandstone.

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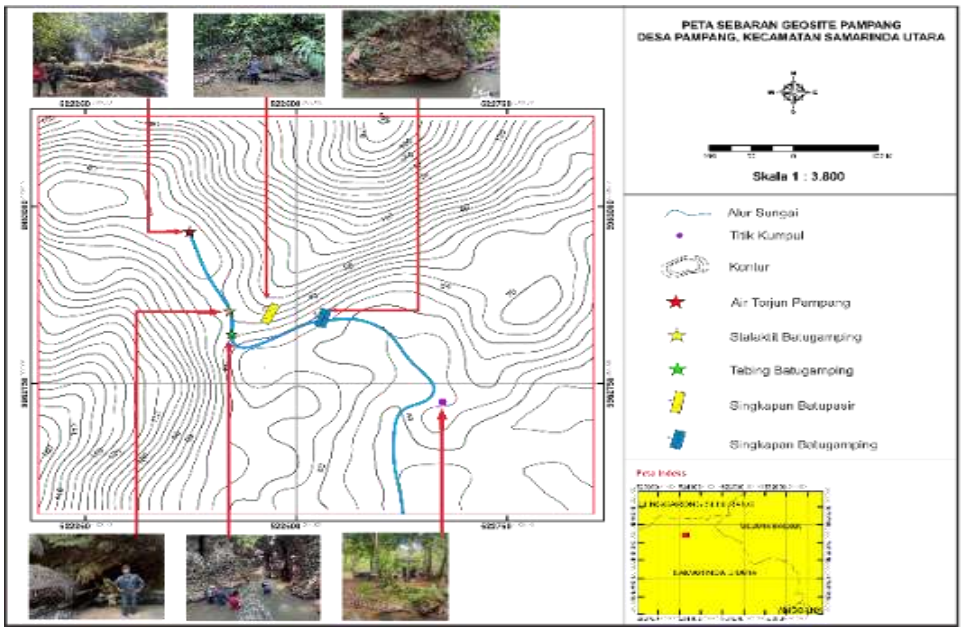

Figure 3. Geosite Distribution Map in the Research Area

Geosite

Lamin Traditional House

Before entering the Pampang River and Pampang Waterfall tour, we can see the Lamin traditional house in the middle of the Pampang Village settlement. This Lamin traditional house is an icon of the village, and the Dayak community holds traditional events every Sunday, such as dances and other performances. Around the Lamin traditional house's courtyard, vendors display their products for sale, such as bags, clothes, bracelets, and so on.

Figure 4. Lamin Pampang Traditional House: A) Traditional House Hall, B) Craft Vendors' Area, C) Close-up of Traditional House Hall, D) Vehicle Parking

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Pampang River

Along the Pampang River, you'll find natural beauty and interesting geological formations, such as limestone tunnels and stalactites. This area is inland, located quite far from residential areas, so the only views along the journey are forests and oil palm plantations.

Figure 5. Pampang River Tourist Attraction: A) Reef Limestone, B) Stalactite Appearance, C) Remaining Limestone Outcrops in the Riverbed, D) Limestone Outcrops in the River Flow Forming a Corridor

Limestone Stalactites

On the way to Pampang Waterfall, you'll encounter rock features that are common in caves. Caves feature stalactites and stalagmites, and on the way to Pampang Waterfall, you'll encounter stalactites in the limestone cliffs. Stalactites are caused by the chemical dissolution of limestone, which then forms upright cones on the upper level.

Figure 6. Limestone Stalactite Appearance
Limestone Cliff

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The limestone cliffs along the Pampang River are a geological phenomenon composed of limestone and separated by the river. The limestone cliffs rise 10–15 meters above the river surface, and the path along the limestone cliffs to the end is 70–120 meters.

Pampang Waterfall

This location offers pristine and serene beauty. Pampang Waterfall is close to Pampang Cultural Village. Access to Pampang Waterfall does require some effort due to its hidden location and sometimes challenging journey, but for nature lovers and adventurers, the beauty is well worth it.

Figure 7. Waterfall Tourist Attractions in Pampang Village, A) Pampang Waterfall B) Sandstone Outcrops in the Waterfall Area

Geosite Assessment

Assessment of Science Values

Scientific values are the geological scientific values found in a geological heritage site that can explain geological features and processes. There are four criteria in the science assessment, representing the topics of geology, processes, elements, and geological framework. The results in the science values assessment table show a total weighting of 58.75% for the Pampang River geosite and 58.75% for the Pampang Waterfall geosite.

Table 1. Assessment of Science Values

Assessment of Science Values	Pampang River (%)	Pampang Waterfall (%)
Locations that represent the geological framework	`30	22,5
Key research sites	10	5
Scientific understanding	0	0
Conditions of the geological site/site	11,25	11,25
Geological diversity	5	2,5
a. Minerals	1,25	1,25
b. Rocks	1,25	1,25

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Assessment of Science Values	Pampang River (%)	Pampang Waterfall (%)
c. Fossils	1,25	0
d. Structure/tectonics/processes (geodynamics)	2,5	1,25
e. Landscape	1,25	1,25
Presence of geological heritage sites	15	7,5
Constraints on site use	10	5
Total	58,75	58,75

Educational Values Assessment

Educational values are those inherent in a geological heritage site, enabling it to be taught at all levels of education. These educational values are based on four criteria: the capacity of a geological element to be understood by students at various educational levels. The results of the educational values assessment table show that the total weighting for the Pampang River geosite is 45% and the Pampang Waterfall geosite is 47.5%.

Table 2. Educational Values Assessment

Educational Values Assessment	Pampang River (%)	Pampang Waterfall (%)
Vulnerability	2,5	5
Site Accessibility	2,5	2,5
Obstacles to Site Utilization	2,5	2,5
Security Facilities	5	5
Supporting Facilities	3,75	3,75
Population Density	3,75	3,75
Relationship with Other Values	1,25	1,25
Site Status	1,25	1,25
Distinctiveness	2,5	2,5
Conditions of Geological Element Observations	5	5
Potential for Educational/Research Information	10	10
Geological Diversity	5	5
Total	45	47,5

Tourism Values Assessment

Tourism is the inherent value of a geological heritage site that can provide added value to a region's income. These tourism values are based on four criteria: the beauty of the geological landscape from various angles, ease of understanding for the general public, ease of access for general visitors, and safety for tourists. The tourism values assessment table shows a total weighting of 35% for the Pampang River geosite and 37.5% for the Pampang Waterfall.

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Table 3. Tourism Values Assessment

Tourism Values Assessment	Pampang River (%)	Pampang Waterfall (%)
Vulnerability	2,5	5
Site Accessibility	2,5	2,5
Obstacles to Site Utilization	2,5	2,5
Security Facilities	5	5
Supporting Facilities	3,75	3,75
Population Density	3,75	3,75
Relationship with Other Values	1,25	1,25
Site Status	1,25	1,25
Distinctiveness	2,5	2,5
Conditions of Geological Element Observations	2,5	2,5
Interpretive Potential	5	5
Economic Level	1,25	1,25
Proximity to Recreational Areas	1,25	1,25
Total	35	37.5

Degradation Risk Assessment

The degradation risk assessment is the likelihood of a geological heritage site being damaged by natural conditions and human activities. The assessment table shows that the total weighting for the Singai Pampang geosite is 78.75% and for the Pampang waterfall is 78.75%.

Table 4. Degradation Risk Assessment

Degradation Risk Assessment	Sungai Pampang (%)	Air Terjun Pampang (%)
Damage to geological elements	35	35
Adjacent to areas/activities with the potential to cause degradation	15	15
Legal Protection	10	10
Accessibility	11,25	11,25
Population Density	7,5	7,5
Total	78,75	78,75

Classification

The total weighting of each assessment indicates a class value for each geosite: Pampang River 217.5 (moderate), Pampang Waterfall 220.5 (moderate).

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Table 5. Classification

Assessment Type	Total Weight	
Science Values Assessment	58,75	58,75
Educational Values Assessment	45	47,5
Tourism Values Assessment	35	35,5
Degradation Risk Assessment	78,75	78,75
Total	217,5	220,5

CONCLUSION

Based on the research results, the final assessment results for the Pampang River geosite (217.5) and Pampang Waterfall (220.5) all scored between 201 and 300, falling into the moderate category. This study indicates that the area has potential for geotourism. This is crucial for boosting the local economy, which will ultimately support the development of Pampang Village. A limitation of this research is the initial assessment approach, which relied on the researcher's interpretation, which could lead to subjective bias regarding the geological potential of the study area.

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