

Geosite Potential As Tourism Destination In Jebus West Bangka Regency Bangka Belitung Archipelago Province

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Abstract- Bangka Island was formed by collision of some block geology (terrine) in hundreds million years ago. Earth plate amalgamation driven by tectonic force that caused increasing intensity of magmatism, tin mineralation, structural geology dan metamorphic rock formed. The geological condition has attractiveness to be developed as tourism destination, and many geosite in Bangka Island that interesting and can be claimed. The best geosite that collect the highest unique geology in aspect of rocks, structural geology dan landform variety, was done. The study focused on Bembang Beach and its surrounding area in Jebus District West Bangka Region about 120 km far from Pangkalpinang City as Province Capital and it can be reached in 2,5 hours. In Bembang Beach and its surrounding area found at least 4 of 5 types of all rock formation and alluvial deposited that formed in Bangka Island are Pemali Complex Metamorphic, igneous rock Diabas Penyabung, ancient sedimentary rock Tanjung Genting Formation, plutonic rock Granit Klabat that all rock has million years old age, also young river and beach alluvial deposite. Structural geology has developed as symmetrical or assymetrical fold and trust fault. The landscape unit in geosite is wavy flat and hilly area that gives natural attraction. Beautiful beach area covered by white colour quartz sand, with other condition in the form of villages, culture, hospitality of the population with a strong history of tin, also availability of forest and plantation around the driveway of geosite increasing the potential value for developing the tourism destination as geotourism, natural education tour and geopark.

Keywords–Geosite , potensial, tourism

I. INTRODUCTION

Bangka Belitung Archipelago Province in the future needs an alternative economic driving except tin. As one of a non-renewable natural resource, certainly tin reserves will be reduced and depleted. The other economic resources like agriculture, fisheries and tourism are becoming benefit alternatives. As an archipelagic province, with the natural beauty coastal area, tourism can be an economic potential developed.

Economic alternatives from the tourism sector can be relied upon in the post tin mining era in the future. Geotourism or natural tourism is one of many alternative tourism potential that is very feasible to develop. The Ranbow Troop momentum has passed, but still leaving many beautiful and historical memories that can attract tourist to come for enjoying the beauty of natural objects.

The uniqueness of nature in a variety of beauty geological potentials become the backbone of the development a geosite as an area of high-value tourism destinations. Geosite development as a tourist destination was also developed through an inventory of flora and fauna potential or various typical plants and animals, which directly or indirectly related to the geological setting of the area. Facilities and infrastructure are also of concern in this regard, both in the form of availability of public facilities on site.

A. Regional Geologi

Bangka Island and its surroundings area located in the Sunda Shelf [1], as the results of amalgamation some geological blocks [2], and became a unit of the Eurasian Plate, with stable seismic characteristics [3]. Land area with shallow seas around is a denudational plain resulting from erosion and weathering process on rocks, with granite rocks generally forming as sporadic hilly area named monadnocks, and many being exposed in the beach forming beautiful natural landscapes [4, 5, 6 and 1].

The sequence of magma intrusion in Bangka Island is beginning with the intrusion of Diabas Penyabung in Permian [5]. Cobbing et al. (1992) in Crow [7] estimate that these rocks are basic facies of the precursors of Klabat Granite. Furthermore, in the Late Triassic-Early Jurassic based on Margono et al. [6] there was an acidic magma intrusion formed Klabat Granite rocks and by tectonic (endogenic) processes that lifted rocks to the surface of the earth and weathered (exogenic), until its revealed now days. Granite intrusion bodies are found as scattered bodies, such as Batolith of Granite Klabat, Pelangas, Menumbing, Mangkol, Tempilang and Taboali [8].

B. Geotourism

Geotourism or natural tourism is a sustainable tourism that focuses on the evolution of the earth and geological features that encourage understanding of the environment and culture, appreciation, conservation, and can benefit the local community [9]. Geo-tourism activities have quite a variety, including geo-site sightseeing, geo-sport, geo-study, geo-conservation and education, geo-festival events, geo-tours, health and wellness to tourism facilities [10]. Tourism potential in a place is obtained through internal and external assessments of natural objects [11].

Geodiversity is a historical elements, including aspect of nature, culture, monument and archaeological sites [12]. Geodiversity represents relationship between geodiversity and geoconservation from the connection between the cultural heritage and biotic, abiotic elements [13].

The planning of natural tourism including the stages of decision making/policy, the planning and implementation process together with the government, entrepreneurs/stakeholders and related communities [14]. Investment of government or private company are needed to present economic activities to improve local livelihoods [15]. Innovative activities in socio-economic need to be created to generate benefits and contribute to the geoheritage, where the local community and stakeholders should receive priority [16].

Stakeholders are very influential in the natural tourism business model in promotion, restoration, safeguarding forests and improving the quality of tourism objects [17]. On the other hand, community empowerment is an integration of tourism planning and management, so the community needs to have a common perception [18].

Development of natural tourism requires infrastructure and supporting facilities [19]. To facilitate visitors traveling around enjoying natural objects can be done by making natural tracks or geotrek [10]. On the other side,

high risk towards diversity, including geo-diversity itself has resulted by urbanization process [12].

II. METHODS

Bembang Beach and its surroundings are located in Pebuar Village, Jebus District, West Bangka Regency with a travel time moreless 1 hour 15 minutes from Muntok City, which is the capital of West Bangka Regency. The distance from Pangkalpinang City is around 2.5 hours or about 125 km. Figures 1 show the location of Bembang Beach and surrounding its area.

The study was conducted through observations of geomorphological (natural landscapes), geology which includes rock and mineral conditions, geological structure, groundwater conditions and geological disasters potential. The local flora and fauna around it are also observed although not the main focus of the research. Likewise, the suggestions and supporting infrastructure available on the beach and village area are also collected as a geosite potential for the development of geotourism or natural tourism or also natural education.

The tools and materials used during the study included maps, geological compasses, magnifying glass (lup), geological hammers, GPS (Global Positioning System), camera and other field equipment.

Landscape analysis or geomorphology using Van Zuidam classification [20] classification and river flow pattern from Howard [21], as well as weathering conditions of rock are of concern in geomorphological analysis. Thematic geological aspects of rock-minerals, geological structure, groundwater and the potential for natural disasters are mapped and analyzed in simply way. Identification and analysis of geological structures including folds, joints and faults on rocks. The condition of groundwater and surface is done through visual observation. Geological natural disaster aspects are carried out on various potential natural disasters that might occur.

III. RESULT AND DISCUSSION

A. Geomorphology Area

Bembang Beach have a long coastline, such as overlay of loose white quartz sand crystal so that give impression like snow from a distance. The coastline have gently morphology with shallow sea as the main characteristic of shelf. The land side have morphology like wavy plain until gently sloping hills with slope variation from $0^{\circ} - 35^{\circ}$?.

The hilly area are arranged by sedimentary rocks that strong to medium folded, jointed and faulting. Figure 2 and 3 illustrates the morphology condition of Bembang Beach and the surrounding area. In northern area of Bembang Beach there is Penyabung Hill that composed by diabasic igneous rock and the other hills like granit. The position of the hills with varied rocks gives the distinctive of morphological colour of Bembang Beach and its surroundings. The existing morphology shows weathering and erosion processes of rock in advanced or mature stages after the rocks have been

lifted, folded, jointed and faulting by tectonic forces. As for river pattern is subdendritik, which describes the control of geological structures.

B. Lithology of Rocks

Some rock formations are found in Bembang Beach and its surroundings area, making this location as richest rock diversity on Bangka Island (Figure 2, 3 and 4). There are four rock formations and one younger sediment :

1. Filit and Quartzite of Pemali Complex. Filit has a, fresh reddish gray color, showing a phytitic structure, with quartz thin veins, and iron oxide. Rocks are strongly jointed and folded, and also faulted.
2. Diabas Penyabung rock which is not found elsewhere in Bangka. Hypobasaltic rock has characteristics of grayish black color, hypocristalline, equigranular with fine crystals. The rock structure is massive, thin sheets quartz veins and iron oxides fill the cracks.
3. Alternations of sandstone, claystone of Tanjung Genting Formation. The rocks have a slightly reddish gray color, fine grain size, wavy lamination-lamination structure, compact to brittle. Rocks are strongly folded and jointed with quartz and iron oxides veins, and faulting.
4. Klabat Granite igneous rock has the characteristics of fresh colors of light gray to grayish white, faneritic, holocrystalline, equigranular, with massive structure and compact, minerals dominated by quartz and plagioclase.
5. The loose materials Alluvial deposits in river, swamps, valleys and beaches area.

C. Geological Structure

Geological structures that developed on the rocks in Bembang Beach and its surroundings are folds, joints and faults. The folds structure well developed in sedimentary rocks that widely distributed. The fold geometry shows variations in symmetry and asymmetry. Based on the field measurement, the limb angle of fold has variations gentle to steep, strike variations is N 125° E/41°

and N 300° E/51° which relatively orientation fold axis northwest-southeast (Figure 4).

Joint in rocks are widely distributed and filled by secondary minerals quartz with varying thickness. The types of joint are shear, compression and tension. The Joints has a systematic and non-systematic geometry, and cutting each another. Rock blocks has varying shape and size. Thrust faults and topographic alignments form hilly morphology in Bembang Beach and its surroundings. A minor trust fault on rocks revealed in Bembang Beach following rock folding pattern with the northwest-southeast direction of fault. The presence of trust faults shows compressional stress that has worked on rocks.

D. Groundwater

Groundwater conditions cannot be identified properly at the geosite area. The loose deposits in coastal areas are suitable for groundwater reservoirs. Likewise with the presence of fractures in rocks can be a secondary reservoir of groundwater, its phenomenon can be found in several places as water springs that flow out from rock cracks.

E. Potential Geological Natural Disasters

Some of natural disasters potential found on Bembang Beach are coastal abrasion, rocks sliding and earthquake. The coastal abrasion disasters is still relatively low. The presence of mangrove become an effective natural prevention. According to Irvani and Gunawan [22], coastal abrasion occurs widely on Bangka Island, estimated that only about 14% of all coastlines with low/without abrasion. On the hilly wall rock in beaches area are collaps that indicate the occurrence of rock failure. The types rock failure, sliding and toppling are potential. The joint structure on rocks is the main discontinuity causes sliding potential. The potential for earthquake disasters is also owned by the research location, where in 2007 the earthquake occurred in the study area with 4,1 richter scale magnitude. The epicenter is in the western part sea of Jebus, precisely around the thrust fault zone which passes through Bembang Beach The earthquake event then repeats several years to 2017 with a small magnitude.

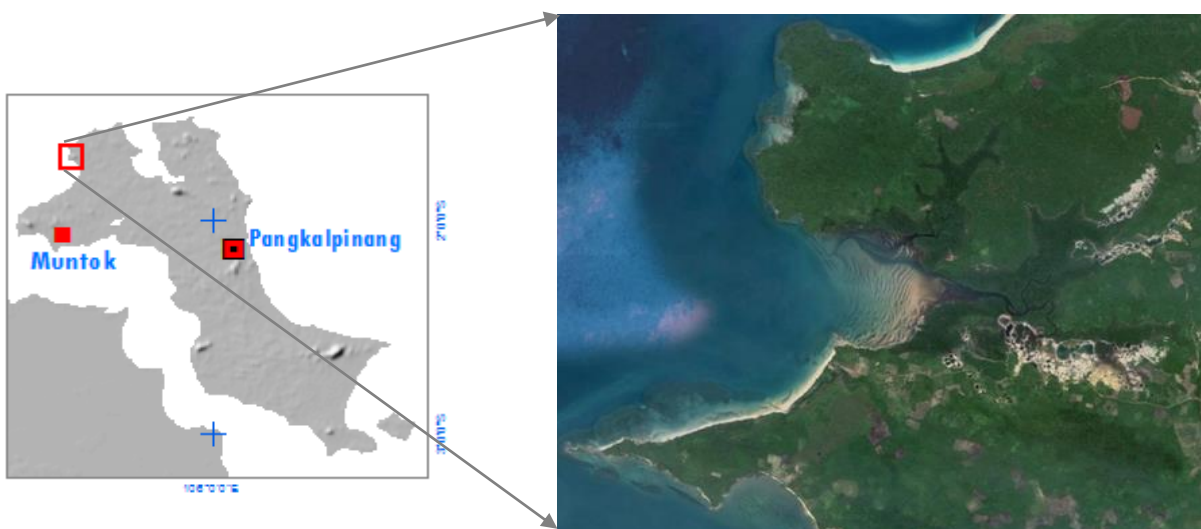


Figure 1. Location of Geosite Potential for Geotourism in Jebus District

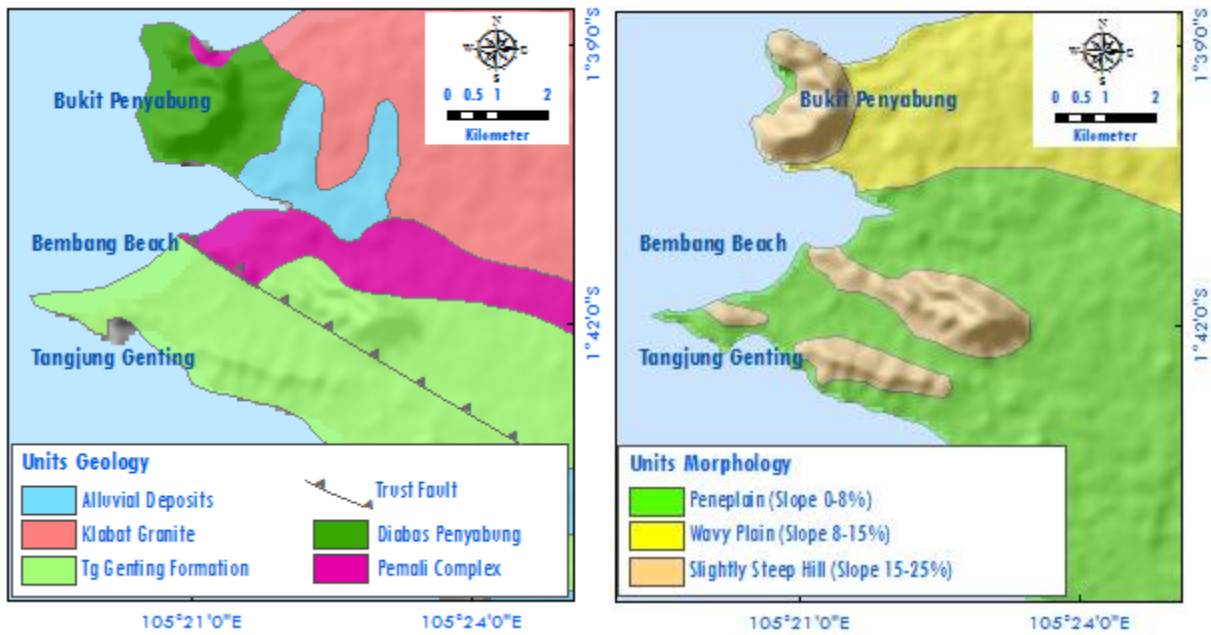


Figure 2. Location of Geosite Potential for Geotourism in Jebus District

F. Natural Uniqueness and Supporting Facilities Available

The biodiversity on Bembang Beach and its surroundings are very closely related to its geological setting (geodiversity). Various geodiversity can be developing as natural tourism destinations (geotourism/educational tourism) are:

1. The landscapes (geomorphology) Bembang Beach and its surrounding area in thousands of hectares area provide a variety of natural beauty.
2. Gentle hilly area are easy to tracing
3. The lengthy coastline gives more space for visitors, with wide hilly area.
4. Shallow sea level that makes it easy to swim
5. Vary of rock types some rock formations with hundreds millions years old.
6. Folds structure with curved shapes such as waves on water, joint structures with variation patterns, and fault structures on rocks.
7. The groundwater resource
8. The biodiversity of local flora and fauna, including mangrove forests
9. Ex-tin mining location
10. Plantation area around the beach entrance
11. Supporting facilities like bathroom, small mosque and camping area.
12. Fisherman activities
13. Activities the women looking for mussels and sea worm.
14. The local community culture with theirs tin history, etc.

G. Weaknesses as Tourism Destinations

Various things that Bembang Beach and its surroundings do not have to promote as a tourist destinations:

1. Access to the location is far from Pangkalpinang City, so requires the availability of better accommodation facilities for tourists.
2. Not yet assessment as geosite.
3. The unavailability of a natural tourist map as a guide for visitors
4. Natural tracks are not yet available to explore natural attractions, hilly and plantation areas
5. There is no academic information based on geology, flora and fauna available.
6. The surrounding community has not yet gained an understanding of nature conservation.
7. Information and tourist profiles not yet available through internet sites as promotional media, so they are not widely known.



Figure 3. Photo left-right: Slightly steep hill morphology unit, Penyabung Beach and Bembang Beach



Figure 4. Photo left-right : Strongly folded metamorphic rock, Diabasic rock and Sedimentary rock

H. Development Strategy

Some various strategies that can be developed to lift Bembang Beach and its surroundings as one of distinguish natural tourist destination, can be refer to UNESCO's in providing various applications needed:

1. The mapping geodiversity and biodiversity potential area for tourism.
2. Providing of convenient tourism facilities and infrastructure for visitors.
3. Stakeholders and local communities empowerment, together with government to develop and promotion.
4. Giving education to all related parties
5. Providing protection for natural tourism or geotourism objects from damage with the involvement of local communities.

IV. CONCLUSION

It can be concluded that the geosite of Bembang Beach and its surroundings has the richest geodiversity on Bangka Island and follows biodiversity potential that is very support to developed as geosite for geotourism. The disadvantage lies in the lack of planning and development action as a distinguish tourist destination and the location enough far away from the city, so needed better tourist facility for rest.

Mapping the potential of natural tourism, education, stakeholder and community empowerment for planning, promoting and developing tourism must be the focus of work. Conservation and protection of natural resources is also carried out by involving all elements.

ACKNOWLEDGEMENTS

The present contribution is part of the jointing research Mining Departement University of Bangka Belitung with Mineral and Energy Services of Bangka Belitung Archipelago Province. The authors want to thank for all support of partisipans.

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