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Geotourism And Cultural Prospects of Rupat Island, Bengkalis, Riau

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ABSTRACT

The area of interest is located on Rupat Island, in the north of the Central Sumatra Basin, and faces directly the Malacca Strait, specifically in the North Rupat District, Bengkalis Regency, Riau Province, with the development of natural tourism objects and attractions. The geology of this area consists of two main formations, namely the Old Superficial Sedimentation Formation (QP) consisting of silt, clay, gravel, and plant residues, and the formation of young sedimentation (QH) consists of clay, silt, slippery gravel, residual plants, and peat swamps. There is also silica sand that is only found on the coastline in the north of Rupat Island, which is greatly influenced by the current of the Malacca Strait as a sediment transportation agent from Indian Ocean and South China Sea. There is a fault structure along with the silica sand deposition creating the main objects of geotourism that are found in the northern Rupat area in the form of Lapin Beach, Pesona Beach, Tanjung Api Beach, and Beting Aceh Beach. To visit the geotourism area both road and sea by boat, also made supporting facilities such as homestays, local road points, and signboard. There is also a diversity of flora and fauna in the form of pine trees, and mangrove forests, mammals such as deer, birds such as hombills, crows, and primates such as long-tailed monkeys, beruk and lutung are quite easy to find along the mangrove forest. There is a diversity of Malay cultures such as Zapin Dance and Safar Bathing. This research was aiming to develop geotourism prospects that have not been explored and create new potential for tourism products in North Rupat, Rupat Island.

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1. INTRODUCTION

Tourism has the potential to grow in the Rupat Utara District, Bengkalis Regency, and is currently a popular local tourist destination. For the viability and sustainability of this area, the growth of geotourism is a must.

The study site is situated at 2°8’03" LU - 101°33'00.00" E and 2°5'02" LU - 101°43'25.10" E. The study is being conducted in the Riau Province’s Bengkalis Regency’s Rupat Utara District. From downtown Dumai, (as seen in figure 1), the study area can be reached and accessible in about 3 hours.

Rupat Island has two main formations, namely the New Surface Sediment Formation (Qh) and the Old Surface Sediment Formation (Qp). Old Superficial Sediment Formation (Qp) consisting of clay, silt, loam, gravel, and plant remains. The Young Shallow Sediment Formation (Qh) consists of clay, silt, slippery gravity, plant remains, and peat swamps. This formation is aged from today. Silica sand is carried by

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the flow of the Malacca Strait as a sediment transport agent. Silica sand is spread only on the northern coastline of the island (Figure 2), aerial photographs for observation points can be seen in Figure 3, and field observations are shown in Figure 4.



Figure 1

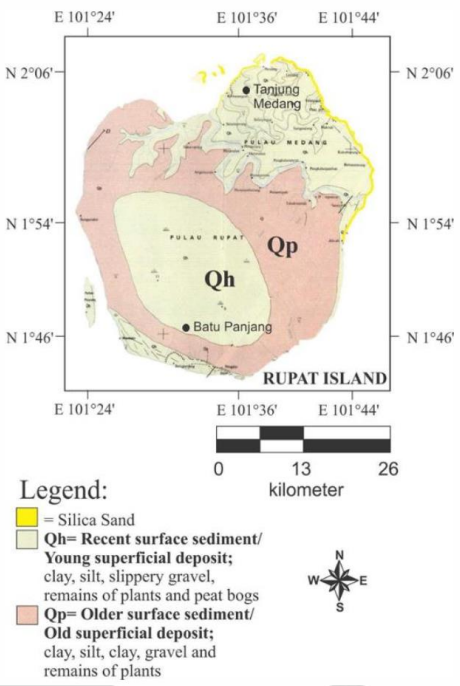


Figure 2 The Geological Map of Rupat Island

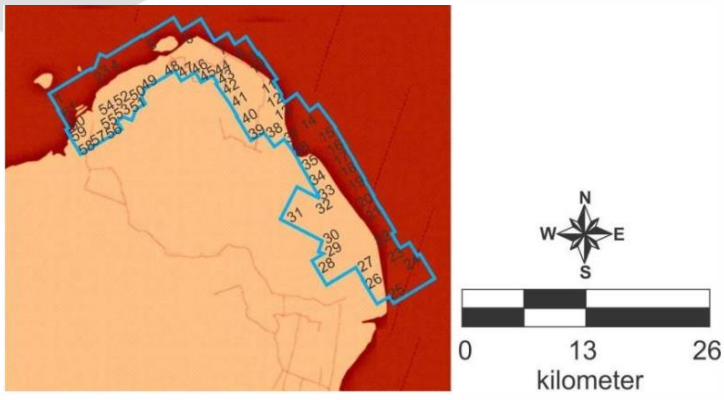


Figure 3 The Geological Map of Rupat Island Silica Sand Distribution Field Observation Points on the Northern Coastline of Rupat Island

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Figure 4.
The Aerial Photograph of Silica Sand Distribution on the Northern Coastline of Rupat Island

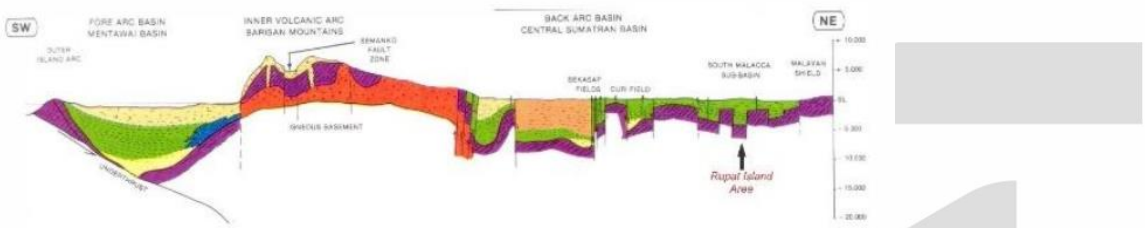


Figure 5

Rupat Island located in the north of Central Sumatra Basin and directly opposite the straits of Malacca. The geological structure of the northern part of Central Sumatra Basin was developing at the time of Neogen and asymmetrical shape that led northwest-southeast (NW-SE) which is a pattern of young structure (Figure 5).

2. METHODS

The methodology consist, Geological Mapping, Sample Validation at Observation Sites, and Laboratory Tests.

- Geological Mapping

This research includes plotting observation points, observing sand outcrops, sampling, and laboratory analysis. Field observations in North Rupat District (the northern part of Rupat Island) began in areas along the coastline, namely: Tanjung Mumbul, Simpur Island, Kemunting Island, Babi Island, Aceh Shoal, Tax Island, Beruk Island, Tengah Island, Tanjung Medang, Rhu Bay, Tanjung Punai, Tanjung Lapin, White Sand. Based on field observations, there are five main observation locations selected as study areas that are represented along the northern coastline of Rupat Island, namely; Aceh Shoal (BA, Tanjung Api (TAp), Teluk Rhu (TRh, Tanjung Punai (TPn) and Tanjung Lapin (TLp). Sand sampling was carried out. Samples were taken from the area.

- Sample Validation At The Observation Site

Figure 4 also shown some study areas and silica sand distribution by an aerial photograph. Silica sand sampling was conducted using field collection such as excavation. All sample from the observation location shows the color of the sand is virtually white and homogeneous from the field observation that.

• Laboratory test

The determination of silica percentage content and the compound of mineral properties, laboratory testing was used for the sand samples obtained from the field survey. The chemical analysis is needed to

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get the types of compounds/elements, the physical properties and the percentage content of the compounds/elements.

o X-Ray Fluorescence (X-RF)

The laboratory test was conducted to get the content of minerals in these samples. X-Ray Fluorescence (X-RF) was used to get mineral's content information. The microscopic photograph also used to know the shape and size of the fragment/grain of the mineral's composition. X-RF (X-Ray Fluorescence) shows the result of silica sand samples contain of minerals which are SiO2 (Silicon dioxide), TiO2 (Titanium dioxide), A12O3 (Aluminum oxide), Fe2O3 (ferric oxide), MnO (Manganese (II) oxide), MgO (Magnesium oxide), CaO (Calcium oxide), Na20 (Sodium oxide), K2O (Potassium oxide) and P2O5 (diphosphorus pentoxide). X-RF test were used to get compound/mineral percentage content for 5 main locations (Bering Aceh, Tanjung Api, Teluk Rhu, Tanjung Punai and Tanjung Lapin).

3. RESULT AND DISCUSSION

Field observations on Rupat Island show that the distribution of silica sand on this island is not located along the island's coastline (Figure.6). Silica sand is only found in the northern part of the coastline, starting from the Tanjung Mumbul area to Pasir Putih (see Figure 4).

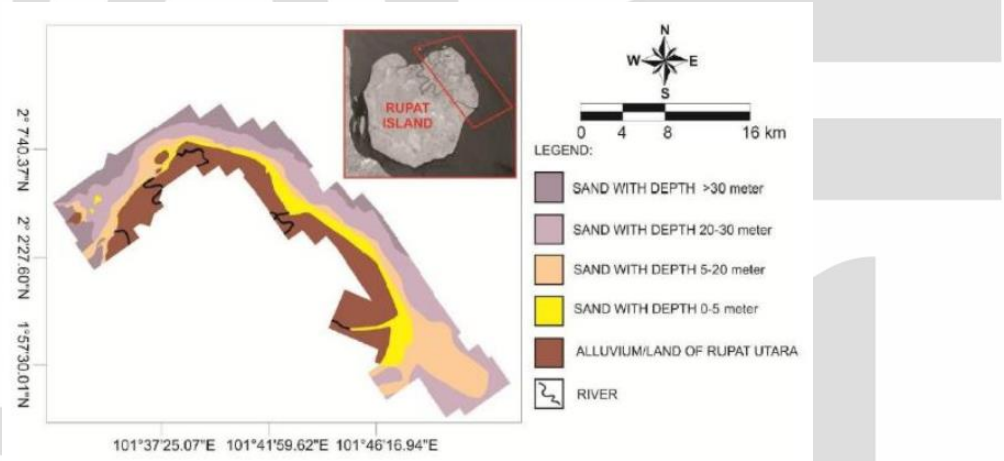


Figure 6

The distribution of silica sand on this island is strongly influenced by the Malacca Strait currents as a sediment transport agent (Figure 7). The northern part of Rupat Island is directly facing the Malacca Strait. The Malacca Strait lies between Peninsular Malaysia and Sumatra Island. This strait is one of the meeting points between the Indian Ocean to the northwest and the South China Sea to the northeast and carries sediment sources as a means of transportation from the two oceans.

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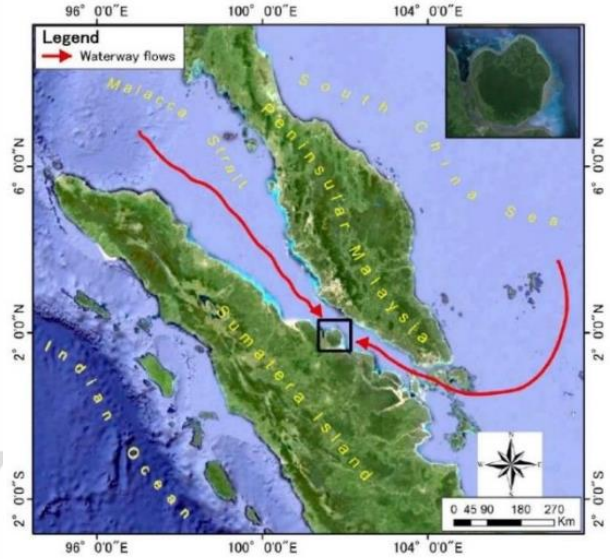


Figure 7. Waterway Flows of Malacca Strait as a Sediment Transport Agent for the Silica Sand Sedimentation

The existence of silica sand on Rupat Island cannot be separated from the role of the Malacca Strait. Silica sand is brought from the currents of the two seas over the Malacca Strait. The source rock is composed of igneous rock that has been abundant with quartz/silica minerals, especially the South China Sea through the Riau Archipelago Province (which is known as a very rich igneous area) before entering the Malacca Strait.

The origin of the silica sand on Rupat Island is not from the bedrock of this island. The island in the north facing the Malacca Strait gets a supply of sand sediment from the water flow. The Malacca Strait transports sand sediment material from the Indian Ocean in the northwest, while in the northcast sand sediment material is obtained from the South China Sea and the Riau Archipelago (see Figure 7).

There are many sources of sand in the northern part of the island. This is because the currents that carry sediment sources arc clogged in the northern part of Rupat Island and deposit sand on the north coast of the island. The silica sand comes from the Malacca Strait as a means of transporting sediment. Compared to the bedrock of Rupat Island which consists of New Surface Sediments (Qh) and Old Surface Sediments (Qp) which arc composed of clay and peat as a general composition, the bedrock is unlikely to produce sand grains.

Apart from the bedrock of Rupat Island which is impossible to produce silica sand, the origin of the source of silica sand is also proven by the results of microscopic photographs showing the rounded shape of the silica sand particles. Allegedly the source/origin of silica sand comes from a remote location. Microscopic photographs of the five main locations (Shaft Aceh (see Figure 8), Tanjung Api (see Figure 9), Teluk Rhu (see Figure 10), Tanjung Punai (see Figure 11) and Tanjung Lapin (see Figure 12)) can represent the area this research was in the Aceh Shoal, Tanjung Api, Teluk Rhu, Tanjung Punai, and Tanjung Lapin. Microscopic photos were taken to show the grain size of silica grains, and the grain size of silica sand particles which have almost the same size and shape.

Referring to the origin of sediments and their relationship with sediment transport agents the grain shape and grain size characteristics of silica sand sediments on the north coast of Rupat Island are spherical and almost the same size. This means that silica sand is transported from a remote location/source. This analysis also supports that silica sand was not produced by the bedrock of this island.

All samples from the observation sites showed almost white and homogeneous properties of silica sand by direct observation in the field.

Grain Size from Microscopic Photograph of Silica Sand Samples:

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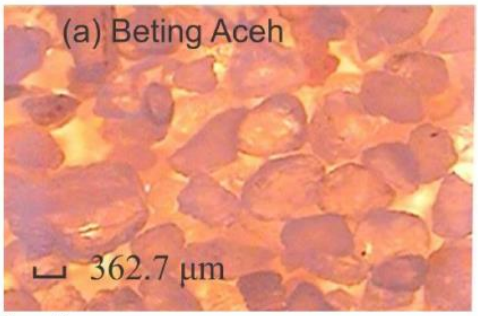


Figure 8

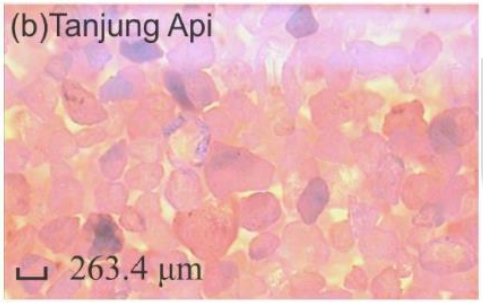


Figure 9

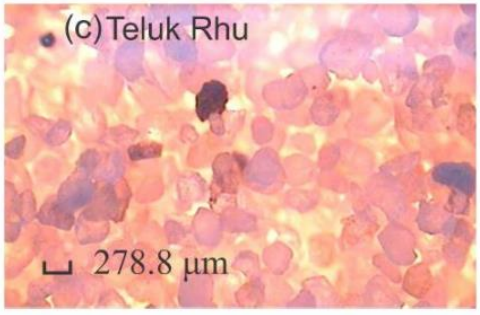


Figure 10

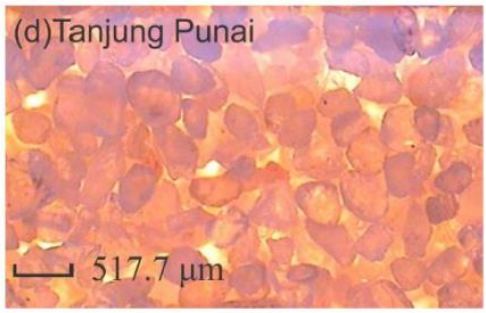


Figure 11

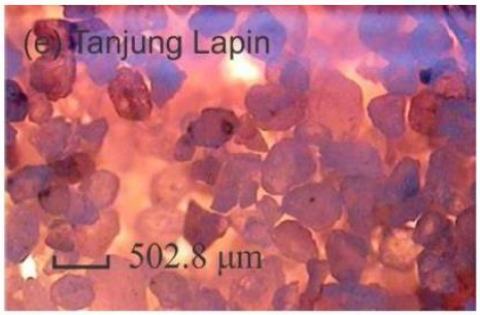


Figure 12

Percentage of Silica Compounds

Determination of the percentage of silica compounds and the properties of mineral compounds was used in laboratory tests on sand samples obtained from field surveys. Chemical analysis of silica sand samples needs to be carried out to obtain the type of compound/element, physical properties, and percentage of compound/element content.

Laboratory tests using XRF (X-Ray Fluorescence) showed an abundance of compounds: SiO2 (Silicon dioxide), TiO2 (Titanium dioxide), A12O3 (Aluminum oxide), Fe2O3 (iron oxide), MnO (Manganese (II) oxide), MgO (Magnesium oxide), CaO (Calcium oxide), Na2O (Sodium oxide), K2O (Potassium oxide) and P2O5 (diphosphorus pentoxide). The results showed that the silica compound (SiO2) has a high percentage of above 95% compared to other minerals in the same sample. The second abundant mineral in this sample is A12O3 which has an average percentage of about 0.70% and is followed by other minerals as samples in small quantities from the northern part of Rupat Island. The XRF test shows the percentage of compounds/minerals (Table 1) for five observation locations (Beting Aceh, Tanjung Api, Teluk Rhu, Tanjung Punai, and Tanjung Lapin).

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Table 1

Compound/ Mineral	Percentage (%)				
	Beting Aceh (BA)	Tanjung Api (TAp)	Teluk Rhu (TRh)	Tanjung Punai (TPn)	Tanjung Lapin (TLp)
SiO_2	98.42	97.89	97.45	97.83	98.06
TiO_2	0.19	0.09	0.09	0.07	0.26
Al_2O_3	0.55	0.69	0.85	0.67	0.65
Fe_2O_3	0.38	0.35	0.36	0.36	0.48
MnO	bdl*	bdl*	bdl*	bdl*	bdl*
MgO	0.10	0.10	0.10	0.12	0.12
CaO	0.18	0.20	0.21	0.20	0.20
Na_2O	0.05	0.65	0.19	0.09	0.07
K_2O	0.22	0.32	0.48	0.32	0.23
P_2O_5	0.01	0.01	0.01	0.01	0.01
L.O.I**	0.40	0.32	0.33	0.41	0.41

*bdl: below detection limit
**L.O.I: lost on ignition

X-RF Result of Silica Percentages of the Silica Sand Samples from Northern Part of Rupat Island.
Some of the tourist objects in the North Rupat area have become local tourist objects and some have not yet become tourism (potential to become tourism), while some of them are as follows:

1. Lapin beach
2. Pesona Beach
3. Tanjung api beach
4. Beting aceh beach

There are geotourism distribution locations plotted on the map. Shown in Figure 13.

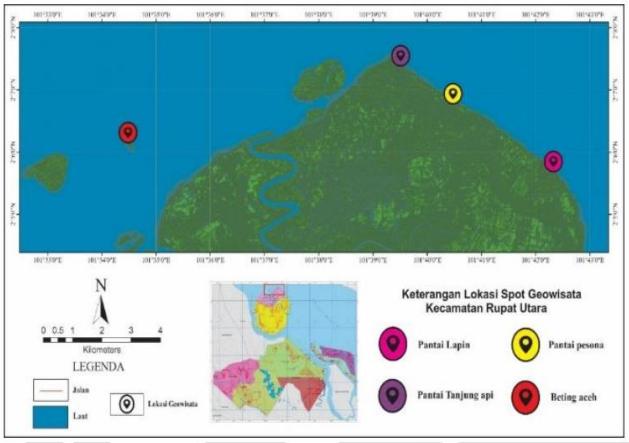


Figure 13. North Rupat Geotourism Potential Distribution

1. LAPIN BEACH

Lapin Beach Tourism is one of the most popular tours among the people of North Rupat. The interesting thing about Lapin Beach is the white sand beach and it is very wide and the sea water is blue. The beautiful appearance of Lapin Beach can be seen in Figure 14. Silica sand constituent lithology. In general, the Lapin beach tourism facilities on average the facilities provided are sufficiently supportive.



Figure 14

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2. Pesona Beach

Pesona beach tourism takes advantage of the beauty of the vast white sand and its blue sea water. The lithology that makes up this tour is silica sand. The beauty of this beach can be seen in Figure 15.



Figure 15

3. TANJUNG API BEACH

This Tanjung Api beach tour provides extraordinary beach beauty because on this beach we can see the beauty of the coastal landscape by climbing the lighthouse which is located on this Tanjung Api beach. The appearance of beauty of Tanjung Api Beach can be seen in Figure 16. The lithology of the pillar of fire beach is silica sand.

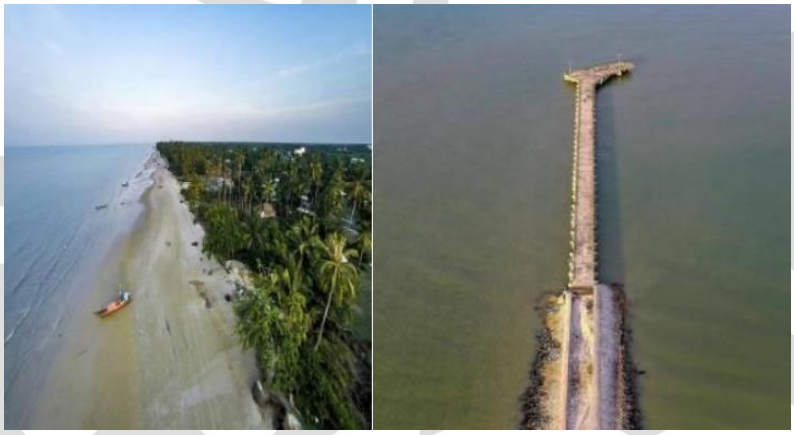


Figure 16

4.BETING ACEH

The appearance of the tourist landscape of the Beting Aceh Shoal is very beautiful, a shoal with a wide expanse of white sand and blue sea water can spoil the eye. The appearance of the beautiful Aceh Shoal can be seen in Figure 17. The lithology that makes up the Aceh Shoal is silica sand.

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Figure 17

Flora and fauna

Harendong (Melastoma malabatricum), fems (Nephrolepis sp.), tendrils (Nephentes sp.), and others can find habitat types. Then in the mangrove habitat, most of it is composed of the formation of Rhizopora sp., and further up the river, it is mixed with large pandanus (Pandanaceae).

This secondary forest habitat is inhabited by wildlife species such as deer (Cervus unicolor), mouse deer (Tragulus javanicus), wild boar (Sus scrofa), hombill (Buceros rhinoceros), tiung (Gracula religiosa). Primates such as long-tailed macaques (Macaca fascicularis), macaques (Macaca nemestrina), and langurs (Presbytis cristata) can also be found in secondary forests, especially on riverbanks. This indicates that these species vary widely in their habitat and home range.

Zapin Api

Zapin Api originates from the presence of the Akit tribe who came from Malacca to perform Bele Kampong (village guard). To combine the four elements of life in nature, namely fire, water, earth, and wind (Figure 18). However, after the influence of Islam entered Rupat Island, which was brought by the Acehnese of Arab descent, the fire dance was changed to a dance.



Figure 18

Mandi Safar

The routine ritual which is held every month of Safar is attended by hundreds or even thousands of male and female community members, parents, and young people who come from surrounding villages and other areas (Figure 19).

This Mandi Safar tradition began in 1920, this tradition was brought from the coast of Malaysia. North Rupat people often mingle with Malaysian people because the origin of these two community groups is one. Mandi Shafar has been present there since 1920, only taking Safar bathing which is carried out in their respective homes not in an open place by taking water from an old well (sacred well) that has been

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given wafak. However, over time the implementation of the Shafar bath was carried out simultaneously in an old well near the Tanjung Lapin beach. The shift in the implementation of the Shafar mandi occurred in the 2000s after the concern of the local government and the local community to preserve this ritual should not be lost and forgotten by future generations.



Figure 19

4. CONCLUSION

There is silica sand that is only found on the coastline in the north of Rupat Island, which is greatly influenced by the current of the Malacca Strait as a sediment transportation agent from Indian Ocean and South China Sea. The main objects of geotourism that are found in the northern Rupat area in the form of Lapin Beach, Pesona Beach, Tanjung Api Beach, and Beting Aceh Beach. To visit the geotourism area both road and sea by boat, also made supporting facilities such as homestays, local road points, and sign-board. There is also a diversity of flora and fauna in the form of pine trees, and mangrove forests, mammals such as deer, birds such as hombills, crows, and primates such as long-tailed monkeys, beruk and lutung are quite easy to find along the mangrove forest. There is a diversity of Malay cultures such as Zapin Api and Mandi Safar.

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