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Land Suitability Analysis for Marine Tourism on Kalimantung Island, Central Tapanuli Regency, North Sumatera Province, Indonesia

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ABSTRACT
This study aims to spatially analyze the marine ecotourism potential of Kalimantung Island based on the Tourist Suitability Index (TSI). The method used in this research is descriptive qualitative, where the analysis is done with a spatial approach. Data collection techniques used were measurement, observation, and interviews. The data analysis carried out in this study uses scoring techniques. Land suitability analysis is categorized into 4 (four) designations, namely (1) Beach Tourism for Recreation Category, (2) Marine Tourism for diving, (3) Marine Tourism for snorkeling, and (4) Marine Tourism for swimming and canoeing category. The results of this study indicate that the condition of coral reefs on Kalimantung Na Godang Island and Kalimantung Na Menek Island is included in the good category, with coral cover of 55.55% and 52.13 respectively. The Tourism Suitability Index (TCI) for the Recreation Category on Kalimantung Na Godang Island is categorized as suitable with a TSI of 69%. The Recreation TSI of Kalimantung Na Menek Island is categorized as Very Suitable with a Recreation TSI of 95%. The Tourism Suitability Index (TSI) for the Diving Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island is included in the Very Suitable category with a TSI of 83%. The Tourism Suitability Index (TSI) of the Snorkeling Category on Kalimantung Na Godang Island is included in the suitable category with a TSI of 68%. The Recreation TSI of Kalimantung Na Menek Island is included in the Very Suitable category with a Recreation TSI of 75%. The Tourism Suitability Index (TSI) Swimming- Canoeing Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island are included in the Very Suitable category with TSI of 76% and 87% respectively.

INTRODUCTION

Indonesia is a country with high marine and fisheries potential. However, managing the potential of marine and fisheries is still not optimal. An ecosystem approach is one indicator of good marine and fisheries management. The ecosystem approach in fisheries management can be used to evaluate the effectiveness of area-based management. This is done using fisheries management indicators relevant to the ecosystem (Damanik et al., 2016). One of the promising marine potentials in Indonesia is the marine tourism sector. As the largest archipelago in the world, Indonesia has thousands of islands that have the potential to be developed as marine tourism destinations. One of the districts that has an area with a beautiful landscape of small islands is Central Tapanuli Regency in North Sumatra Province.

Central Tapanuli Regency is one of North Sumatra Province's regencies with small islands. There are 33 small islands in Central Tapanuli Regency (Directorate of Small Island Utilization, 2022). Based on the Decree of the Governor of North Sumatera Number 188.44/629/KPTS/2017 Concerning the Reserve of Regional Marine Protected Areas of North Sumatra Province (2017) after going through marine and fisheries resource conditions in the Central Tapanuli Region, the Governor of North Sumatra has also proposed Coastal and Small Island Conservation Areas (KKP3K) and Small Island Parks (TPK) (Simatupang et al., 2019). In line with this, the Regional Medium-Term Development Plan (RPJMD) of Central Tapanuli Regency for 2017-2022 emphasizes development in the tourism sector.

The Regional Original Revenue (PAD) of Central Tapanuli Regency in 2020 reached Rp 87,489,799,130. When viewed from the Gross Regional Domestic Product (GRDP) figures, the most significant contribution was obtained from the Agriculture, Forestry, and Fisheries business field sectors, which amounted to 46.18 percent. Meanwhile, the tourism service sector has not significantly contributed to the GRDP of Central Tapanuli Regency. (Central Bureau of Statistics of Central Tapanuli Regency, 2022)

The coastal and small island tourism sector is the main attraction for the tourism sector in Central Tapanuli Regency. Even in 2005, Mursala Island, one of Central Tapanuli's islands, was used as a shooting location for a Hollywood movie entitled King Kong (Rahmawati, 2020). This shows that the attractiveness of the islands in Central Tapanuli Regency has quite potential.

The number of domestic tourists in Central Tapanuli Regency increases by an average of 9.5% annually. However, the graph is not consistent every year. For the number of foreign tourists, the average increase is 8.2% each year. However, the yearly increase generally tends to be smaller in the last three years (Batubara, 2019). This data shows that tourism management in Central Tapanuli Regency is still not optimal to encourage a significant increase in tourists.

Recently, two islands have become new tourist destinations: Kalimantung Na Menek and Na Godang. This island has a beautiful natural panorama that attracts tourists visiting several surrounding islands. (Hutagalung, 2020). Based on Central Tapanuli Regional Regulation Number 4 of 2007 (Regional Regulation of Central Tapanuli Regency No. 4 of 2007 Concerning the Establishment of Tourist Sites, Preservation, and Prohibition of Tourist Attractions in Central Tapanuli Regency, 2007), the two islands are tourist attraction locations with beach tourism types. Furthermore, in 2020, based on the provisions of the Minister of Maritime Affairs and Fisheries Regulation Number 87 of 2020 concerning the Central Tapanuli Coastal and Small Islands Conservation Area and its Surrounding Waters in North Sumatra Province, the waters of these two islands are also included in the Limited Utilization Zone with Tourism Subzone. (Decree of the Minister of Marine Affairs and Fisheries of The Republic of Indonesia Number 87/Kepmen- Kp/2020 Concerning Coastal Conservation Areas and Small Islands of Central Tapanuli and Its Surrounding Waters in North Sumatra Province, 2020) However, the determination of the location of this tourist attraction has not been supported by an analysis of land suitability and carrying capacity of the area. If this activity continues, there may be a decrease in environmental quality on this island, which is also one of the Regional Marine Conservation Areas. To prevent the rate of damage to coastal and marine ecosystems due to excessive utilization patterns, the concept of resource utilization for marine ecotourism requires a management model focusing on two main approaches: Area Supportability (DDK) and Adaptive Supportability correction (DDA). This approach must be studied scientifically so that the environment can be utilized sustainably (Koroy et al., 2017).

The relationship between available resources and the perceived value of these resources is part of the attractiveness of a

place that is presented in the form of tourism activities (Formica, 2004). To utilize land and natural resources for ecotourism purposes, a design is needed that considers the relationship between existing attractions and the ability of the region to accommodate these activities (Panigoro et al., 2023). Kalimantung Island's tourism development is part of protecting the coastal and small islands (Regional Development Planning Agency of Central Tapanuli Regency, 2016). It must be carried out using sustainable and spatially-based marine ecotourism management (Simatupang et al., 2019). Tourism activities on Kalimantung Island, which are currently taking place, are considered not to have been carried out based on in-depth planning and potential analysis. Until now, there has been no study on the potential development of spatially-based environmentally friendly marine tourism on Kalimantung Island.

Referring to the problems mentioned above, the problem formulations in the study are how the land suitability class of marine tourism can be utilized for the recreation category, diving and snorkeling category, and swimming and canoeing category on Kalimantung Island Na Menek and Na Godang, Central Tapanuli Regency, North Sumatra Province.

This study aims to spatially analyze the land suitability class for beach tourism in the Kalimantung Island area. The novelty of this research is the spatial approach in the study of land suitability to measure the potential of marine tourism on Kalimantung Island, Central Tapanuli Regency, which has not been done at the research location. Geographic Information Systems (GIS) can carefully provide a basis for initial understanding in identifying strategic locations for ecotourism development (Bunruamkaew & Murayama, 2012).

RESEARCH METHODS

This research was conducted on Kalimantung Na Menek and Kalimantung Na Godang Islands, Central Tapanuli Regency, North Sumatra Province (Figure 1). Spatial analysis was conducted on these two islands to present the potential of each island depicted in the form of a map. Field data collection was conducted in August 2023.

The method used in this research uses a spatial analysis approach where all measured parameters are explored in the form of thematic maps (Igarta et al., 2020). The research variables focus on beach tourism for the recreation category, snorkeling and diving marine tourism, and marine tourism for the swimming and canoeing category (Wunani et al., 2013; Yusuf et al., 2019). The data collected in this study consisted of primary and secondary data. Primary data was obtained using measurement, observation, and interpretation of UAV aerial photography. Meanwhile, secondary data was obtained through literature studies. The data collection techniques are presented in the table below.

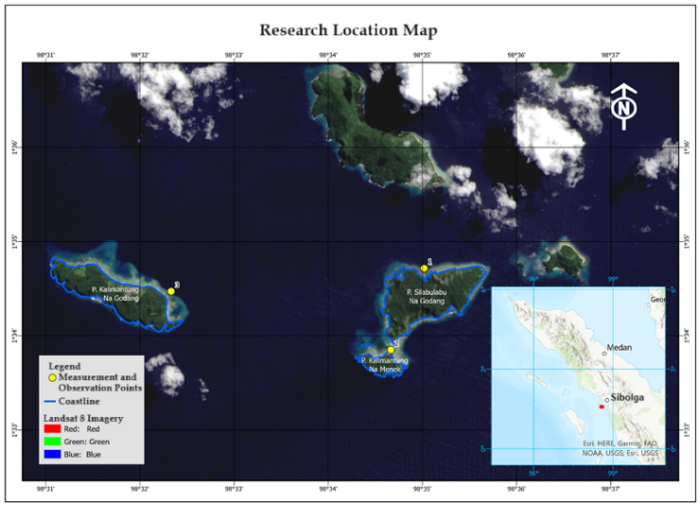

Figure 1. Research Location Map (Source: ESRI, 2023)

Table 1. Data Source and Collection Technique

No.	Data	Source	Data Collection Technique
1.	Water Brightness	Primary	Direct measurement using a Sicci disk.
2.	Depth of Water	Secondary	Bathymetry map of the study site.
3.	Current Speed	Secondary	Data obtained from windy.com is recorded periodically every 1 hour, then the average is calculated.
4.	Live Coral Cover	Primary	Direct measurement using criteria for the percentage level of coral cover.
5.	Life Form Type	Primary	Direct measurement by taking photos of the bottom of the substrate on a frame made of pipe with a length of 100 cm anda width of 100 cm (Research-Monitoring Team, 2006).
6.	Types of Reef Fish	Primary	Underwater photography of coral reefs was taken (Research-Monitoring Team, 2006).
7.	Beach width	Primary	Measured based on the results of UAV aerial photo interpretation
8.	Base material	Primary	Direct observation by observing the water bottom material at several points of the research location.
9.	Beach Type	Primary	Direct observation
10.	Beach Slope	Primary	Direct measurement with Abney level
11.	Beach Land Cover	Primary	UAV Aerial Photo Interpretation
12.	Harmful Biota	Primary and Secondary	Observation and diving for harmful organisms
13.	Fresh Water Availability	Secondary	Interviews and field observations to see the source of water availability

Source: (Wunani et al., 2013; Yulianda, 2007)

Variables were collected by sampling with the underwater Photo Transect method to measure live coral cover. Data collection of reef fish species using fish census techniques using the fish transect method (Yusuf et al., 2019). Calculation of the percentage of coral cover is done using the equation according to UNEP/AIMS (UNEP/AIMS, 1993). The equation used is:

$$c = \sum \left(\frac{li}{l}\right) * 100\%$$

Where c is the percent coral cover (%), li is the length of corals based on growth form (cm), and l is the length of the transect line (m).

The data analysis carried out in this study is divided into two parts, namely (1) land suitability analysis and (2) Land Supportability Analysis. (Wunani et al., 2013). Land Suitability Analysis is categorized into 3 (three) designations, namely (1) Beach Tourism for Recreation Category, (2) Marine Tourism for Diving and Snorkeling, and (3) Marine Tourism for Swimming and Canoeing Category.

Analysis of tourism suitability for the recreational category refers to the criteria according to (Yulianda, 2007). The analysis of tourism suitability for diving and

snorkeling refers to the criteria issued by the National Survey and Mapping Coordination Agency (National Survey and Mapping Coordination Agency, 1996). The level of land suitability is determined based on the Tourism Suitability Index (TSI). The equation used to determine TSI is:

$$TSI = \sum \left(\frac{Ni}{Nmax}\right) * 100\%$$

Where TSI is the tourism suitability index (%), Ni is the value of the i-th parameter (weight x score), and Nmax is the maximum value of a tourism category value (weight x maximum value) (Yusuf et al., 2019).

Table 2. The Criteria of the Tourism Suitability Index for Recreation

No.	Parameters	Weight	S1	Score	S2	Score	S3	Score	N	Score
1	Water depth (meter)	10	0-3	4	>3-6	3	>6-10	2	>10	1
2	Beach Type	10	White sand	4	White sand, little coral	3	Craggy black sand, slightly steep	2	Rocky mud	1
3	Beach Width (meter)	10	>15	4	10-15	3	3-<10	2	<3	1
4	Base Material	9	Sand	4	Sandy Coral	3	Silty sand	2	Mud	1
5	Current Velocity (m/sec)	9	0 - 0,17	4	0,17 - 0,34	3	0,34 - 0,51	2	> 0,51	1
6	Beach slope	9	<10	4	10 - 25	3	> 25 - 45	2	> 45	1
7	Water Brightness (meter)	7	> 10	4	> 5 - 10	3	3 - 5	2	< 2	1
8	Coastal land cover	7	Coconut ,open land	4	Scrub, low savanna	3	Tall scrub	2	Mangrove forest, settlement, harbor	1
9	Harmful biota	7	None	4	Pig Hair	3	Sea urchin, reef fish	2	Sea urchin, stingray, lepu, shark	1
10	Captive water availability (km)	7	<0,5	4	>0,5-1	3	>1-2	2	>2	1
	Total		S1=40		S2=30		S2=20		N=10	

Source: (Wunani et al., 2013; Yulianda, 2007)

Description: S1 = Very suitable, with a score of 75-100%; S2 = Moderately suitable, with a score of 50-<70%; S3 = Conditionally suitable, with a score of 25-<50%; N = Not suitable, with a score of <25.

Table 3. The criteria of the Tourism Suitability Index for Diving

No.	Parameters	Weight	S1	Score	S2	Score	S3	Score	N	Score
1	Water Brightness (meter)	10	15-20	4	10-15	3	5-10	2	< 5	1
2	Coral Reef Cover (%)	10	> 75	4	50-75	3	25-50	2	< 25	1
3	Coral Reef Type	9	> 12	4	7-12	3	4-6	2	<4	1
4	Types of Reef Fish	9	> 50	4	30-50	3	10-<30	2	< 10	1
5	Current Velocity (m/sec)	8	0-0,17	4	0,17-0,34	3	0,34-0,51	2	< 0,51	1
6	Coral Reef Depth (meters)	8	6-15	4	>15-20 or 3-<6	3	>20-50	2	>	1
	Total		S1 = 24		S2 = 18		S3 = 12		N = 6	

Source: (National Survey and Mapping Coordination Agency, 1996; Yusuf et al., 2019)

Description:
S1 = Very suitable, with a score of 75-100%; S2 = Moderately suitable, with a score of 50-<70%; S3 = Conditionally suitable, with a score of 25-<50%, N = Not suitable, with a score of <25.

Table 4. The Criteria of the Tourism Suitability Index for Snorkeling

No.	Parameters	Weight	S1	Score	S2	Score	S3	Score	N	Score
1	Water Brightness (meter)	10	15-20	4	10-15	3	5-10	2	< 5	1
2	Coral Reef Cover (%)	10	> 75	4	50-75	3	25-50	2	< 25	1
3	Types of Reef Fish	9	> 50	4	30-50	3	10-<30	2	< 10	1
4	Current Velocity (m/sec)	9	0-0,17	4	0,17-0,34	3	0,34-0,51	2	< 0,51	1
5	Coral Reef Depth (meters)	8	1-3	4	>3-6	3	>6-10	2	>10	1
6	Coral Floor Overlay (meters)	8	>500	4	>100-500	3	200-100	2	<20	1
	Total		S1 = 24		S2 = 18		S3 = 12		N = 6	

Source: (National Survey and Mapping Coordination Agency, 1996; Yusuf et al., 2019)

Description: S1 = Very suitable, with a score of 75-100%; S2 = Moderately suitable, with a score of 50-<70%, S3 = Conditionally suitable, with a score of 25-<50%, N = Not suitable, with a score of <25.

Table 5. The criteria of the Tourism Suitability Index for Swimming and Canoeing

No.	Parameters	Weight	S1	Score	S2	Score	S3	Score	N	Score
1	Current Velocity (m/sec)	10	0-0,17	4	0,17-0,34	3	0,34-0,51	2	> 0,51	1
2	Aquatic Bottom Material	9	sand	4	Sand Little Coral	3	Living coral	2	Seagrass + Dead Coral	1
3	Water Brightness (meter)	8	10-15	4	7-10	3	5-7	2	<5	1
4	Water Depth (Meter)	8	<5	4	5-<8	3	8-10	2	>10	1
	Total		**S1=16**		**S2=12**		**S3=8**		**N=4**	

Source: (National Survey and Mapping Coordination Agency, 1996; Yusuf et al., 2019)

Description: S1 = Very suitable, with a score of 75-100%; S2 = Moderately suitable, with a score of 50-<70%; S3 = Conditionally suitable, with a score of 25-<50%; N = Not suitable, with a score of <25.

RESULTS AND DISCUSSION

Tourism Potential of Kalimantung Island

Kalimantung Island is part of the Mursala Island group, which has a beautiful coastal panorama. There are two islands named Kalimantung, namely Kalimantung Na Gadang and Kalimantung Na Menek. To the north of Kalimantung Na Menek Island is Silabulabu Na Godang Island, which is also very beautiful. Based on the results of field observations, tourists began to visit the three islands. The natural panorama has white sand, clear water, and beautiful coral reefs.

Coral Reef Condition

Based on the analysis of coral reef monitoring data, it was found that the condition of coral cover on Kalimantung Na Gondang Island was 55.55%. In comparison, the condition in Kalimantung Na Menek was 52.13%. This value has increased from 2021 to 38.78%, based on the research results by Harahap (2021). By the Decree of the Minister of Environment No. 4 of 2001 concerning Coral Reef Damage Standard Criteria (Decree of the Minister of Environment No. 4 of 2001 Concerning: Coral Reef Damage Standard Criteria, 2001), then the percentage of coral reef cover on Kalimantung Na Godang and Kalimantung Na Menek Islands is included in the good category.

Based on the results of significant category identification (% of transect), the most dominant cover on the transect at Kalimantung Na Godang Island is Coral (HC) 55.55%, Dead Coral with Algae (DCA) 16.13%, Sand (S) 11.44%, Recent Dead Coral (DC) 8.54%, and Rubber (R) 8.34%. The distribution of the Major Category in Kalimantung Na Godang Island is presented in Figure 2.

The results of the identification of major categories (% of transect) show the most dominant cover on the transect on Kalimantung Na Menek Island is Coral (HC) 52.13%, Dead Coral with Algae (DCA) 15.12%, Recent Dead Coral (DC) 12.40%, and Rubber (R) 10.08%, and Sand (S) 9.55%. The distribution of the Major Category of Kalimantung Na Menek Island is presented in Figure 3.

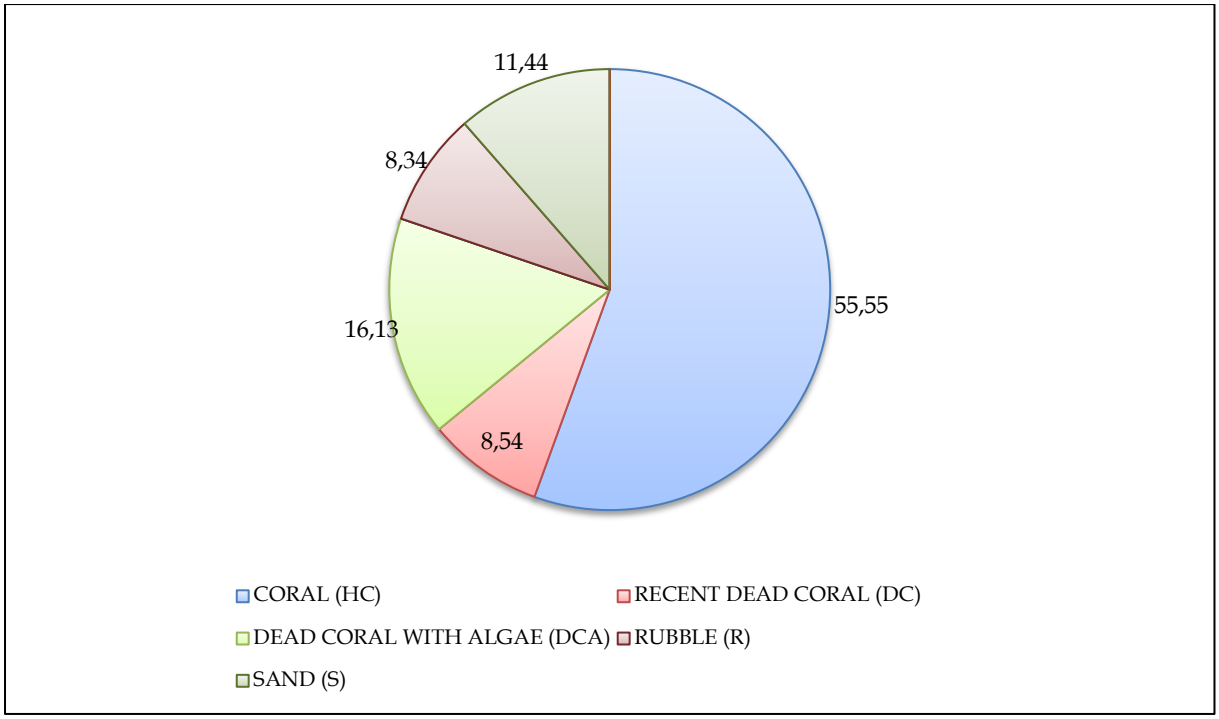

Figure 2. Coral Reef Analysis in Kalimantung Na Godang Island
(Source: Data Analysis, 2023)

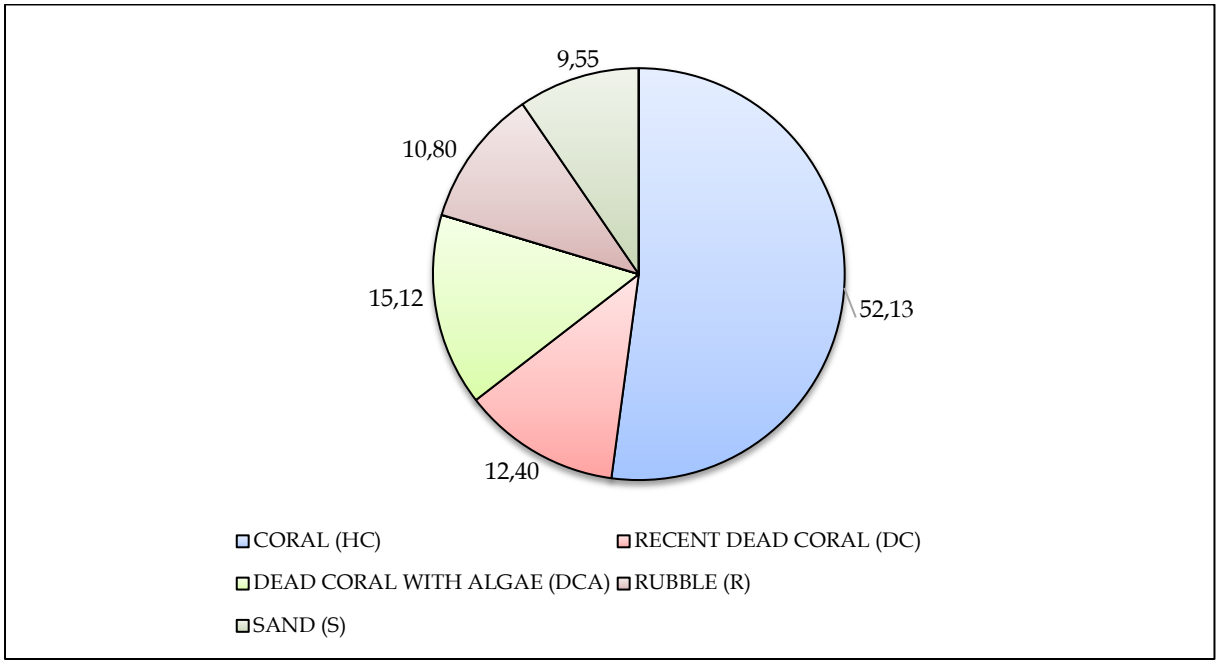

Figure 3. Coral Reef Analysis in Kalimantung Na Menek Island
(Source: Data Analysis, 2023)

Tourism Suitability Index (TSI) for the Recreation Category

Based on the results of measurement and data analysis of variables used to determine the Tourism Suitability Index (TSI) for the Recreation Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island, the TSI for the Na Godang Island recreation category is 64%, and Kalimantung Na Menek Island is 95%.

The Tourism Suitability Index (TSI) for the Recreation Category of Kalimantung Na Menek Island is higher than Kalimantung

Na Godang Island due to the higher parameter values of beach type, beach width, beach land cover, and freshwater availability on Kalimantung Na Menek Island compared to Kalimantung Na Menek Island.

Table 6. Measurement Results of Tourism Suitability Index (TSI) Recreation Category

No.	Parameters	Kalimantung Na Godang			Kalimantung Na Menek		
		Measurement Results	Score	Weight Score	Measurement Results	Score	Weight Score
1	Water depth (meter)	6-10	3	30	3-6	3	30
2	Beach Type	Craggy black sand, slightly steep	2	20	White sand	4	40
3	Beach Width (meter)	<3	1	10	>15	4	40
4	Base Material	Sandy Coral	4	36	Sandy coral	4	36
5	Current Velocity (m/sec)	0.049	4	36	0.048	4	36
6	Beach slope ( )0	> 25 - 45	3	27	< 10	4	36
7	Water Brightness (meter)	3,5	4	28	3,2	4	28
8	Coastal land cover	Scrub, low savanna	3	21	Coconut, open land	4	28
9	Harmful biota	Pig Hair	3	21	Pig Hair	3	21
10	Captive water availability (km)	>2	1	7	< 0,5	4	28
	Total			236			323
	TSI			69%			95%
	Criteria			Suitable (S2)			Very suitable (S1)

(Source: Data Analysis, 2023)

Tourism Suitability Index (TSI) of Diving Category

Based on the measurement results and data analysis of the variables used to determine the Tourism Suitability Index (TSI) for the Diving Category on Kalimantung Island, the results of the TSI value for the Na Godang Island and Na Menek Kalimantung Island diving category are similar at 83%. The Tourism Suitability Index (TSI) for the Diving Category tends to be the same because the condition of the coral reefs of Kalimantung Na Godang Island and Kalimantung Na Menek Island tends to be the same. The area of coral reef cover on both islands is relatively the same at 55.55% and 52.13%.

Table 7. Measurement Results of Tourism Suitability Index (TSI) for Diving Category

No.	Parameters	Kalimantung Na Godang			Kalimantung Na Menek		
		Measurement Results	Score	Weight Score	Measurement Results	Score	Weight Score
1	Water Brightness (meter)	15-20	4	40	15-20	4	40
2	Coral Reef Cover (%)	55,55	3	30	52,13	3	30
3	Coral Reef Type	11	3	27	11	3	27

4	Types of Reef Fish	20	2	18	20	2	18
5	Current Velocity (m/sec)	0.049	4	32	0.056	4	32
6	Coral Reef Depth (meters)	6-15	4	32	6-15	4	32
	Total			179			179
	TSI			83%			83%
	Criteria			(S1)			Very suitable (S1)

(Source: Data Analysis, 2023)

Tourism Suitability Index (TSI) for Snorkeling Category

Based on the results of measurement and data analysis of the variables used to determine the Tourism Suitability Index (TSI) for the Snorkeling Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island, the TSI for Snorkeling category on Kalimantung Na Godang Island is 68% (Suitable). Kalimantung Na Menek Island is 75% (Very Suitable). The Tourism Suitability Index (TCI) for the Snorkeling Category of Kalimantung Na Menek Island is higher than Kalimantung Na Godang Island due to the value of the coral reef depth parameter. For snorkeling needs, coral reef depth is a very determining parameter. This is following the opinion of Yulianda (2007), which reveals that the optimal depth for snorkeling activities is between 1 to 3 meters. Depths of less than 2 meters may cause damage to the coral reef ecosystem as tourists may stand on the coral or touch it with their snorkeling equipment, potentially damaging the coral reef. This is also consistent with the views expressed by Lestari & Anna (2018), which state that waters that are too shallow (less than one meter) or too deep (more than 10 meters) are not suitable for snorkeling. Inadequate depth (less than one meter) will make it difficult for tourists when snorkeling, while too deep depths can also be risky for inexperienced tourists. Therefore, it is advisable for tourists, especially beginners, to use life jackets and get guidance from experienced tour guides to avoid damage to the coral reefs.

Table 8. Measurement Results of Tourism Suitability Index (TCI) for Snorkeling

No.	Parameters	Kalimantung Na Godang			Kalimantung Na Menek		
		Measurement Results	Score	Weight Score	Measurement Results	Score	Weight Score
1	Water Brightness (meter)	15-20	4	40	15-20	4	40
2	Coral Reef Cover (%)	55.55	3	30	55.13	3	30
3	Types of Reef Fish	20	2	18	20	2	18
4	Current Velocity (m/sec)	0.049	3	27	0.048	3	27
5	Coral Reef Depth (meters)	>6-10	2	16	1-3	4	32
6	Coral Floor Overlay (meters)	200-100	2	16	200-100	2	16
	Total			147			163
	TCI			68%			75%
	Criteria			Suitable (S2)			Very suitable (S1)

(Source: Data Analysis, 2023)

Tourism Suitability Index (TCI) of Swimming-Canoeing Category in Kalimantung Island

Based on the results of measurement and data analysis of the variables used to determine the Tourism Suitability Index (TCI) for the Swimming-Canoeing Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island, the TCI for the Swimming-Canoeing category of Na Godang Island is 76% (Very Suitable) and Kalimantung Na Menek Island is 87% (Very Suitable).

The Tourism Suitability Index (TCI) for the Swimming-Canoeing Category of Kalimantung Na Menek Island is higher than Kalimantung Na Godang Island due to the value of the water depth parameter. For swimming-canoeing needs, water depth is an essential parameter. According to research by Tambunan, Anggoro, and Purnaweni (2013), the optimal waters for beach recreation activities have a depth of less than 5 meters. This location is considered the most suitable for recreational activities because it allows tourists to swim or play in water safely.

Table 9. Measurement Results of Tourism Suitability Index (TCI) for Snorkeling

No.	Parameters	Kalimantung Na Godang			Kalimantung Na Menek		
		Measurement Results	Score	Weight Score	Measurement Results	Score	Weight Score
1	Current Velocity (m/sec)	0.049	4	40	0.056	4	40
2	Aquatic Bottom Material	Living Coral	2	18	Living Coral	2	18
3	Water Brightness (meter)	10-15	4	32	10-15	4	32
4	Water Depth (Meter)	8-10	2	16	1-5	4	32
Total				106			122
TCI				76%			87%
Criteria				Very suitable (S1)			Very suitable (S1)

(Source: Data Analysis, 2023)

CONCLUSION

The condition of coral reefs on Kalimantung Na Godang Island and Kalimantung Na Menek Island is included in the excellent category, with a coral cover of 55.55% and 52.13 respectively. The Tourism Suitability Index (TCI) for the Recreation Category on Kalimantung Na Godang Island is included in the suitable category with a TCI of 69%. The TCI for Recreation of Kalimantung Na Menek Island is included in the Very Suitable category with an index of 95%. The Tourism Suitability Index (TCI) for the Diving Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island is included in the Very Suitable category with an index of 83%. The Tourism Suitability Index (TCI) of the Snorkeling Category on Kalimantung Na Godang Island is included in the suitable category with an index of 68%. The TCI for Recreation Category of Kalimantung Na Menek Island is included in the Very Suitable category with an index of 75%. The Tourism Land Suitability (TCI) for the Swimming-Canoeing Category on Kalimantung Na Godang Island and Kalimantung Na Menek Island are included in the Very Suitable category with an index of 76% and 87%.

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