



# Waste Water Management in Supporting Sustainable Tourism in Girsang Sipangan Bolon District

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**Abstract.** Girsang Sipangan Bolon District, Simalungun Regency, is one of the entrance gates to Lake Toba and has an area of 126 km<sup>2</sup> with a population of 18,915 people. Parapat Village is the largest sub-district in this sub-district, and has long been famous for its tourism. Defining and Using Indicators is the main component in the process of planning and managing sustainable tourism, so this will use the main issues and indicators of sustainable tourism development in a tourist destination. This study examines waste management in Girsang Sipangan Bolom District in an effort to support Lake Toba. Implementing policies by reducing the use of chemicals that can harm the environment, reducing waste to the environment and the use of waste disposal systems, and supervising newly established facilities.

**Keyword:** district, sustainable tourism, waste water

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## 1 Introduction

Sustainable tourism is essentially a guarantee that natural, social, cultural and environmental resources can be utilized and passed on to the next generation. Sustainable tourism is not only at one point, but continuously rotates, regenerates itself, and develops for the better [1]. Sustainable tourism is tourism that prioritizes the current generation without forgetting the interests of future generations. Sustainability of community employment opportunities, education on tourism benefits, maintenance of cultural identity, and maintenance of natural and ecological conditions are some of the parts that may be passed on to future generations. Sustainable tourism also needs to maintain tourist satisfaction and ensure meaningful experience to tourists, increase their awareness of sustainability issues and promote eco-friendly tourism practices among them [2].

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The history of tourism in the Lake Toba area is a form of sustainable tourism management. This [3] can be seen from the timeline of the tourism trip which was successful, but slowly faded in the next period [4]. The area of Lake Toba itself lies in 7 districts, namely Toba, North Tapanuli, Humbang Hasundutan, Simalungun, Dairi, Karo, and Samosir, according to the Spatial Structure Around Lake Toba in the RTR in the Lake Toba area and its surroundings. Lake Toba Area (KDT) based on PP No. 50 of 2011 was chosen as the National Tourism Strategic Area (KSPN) because it has the main function of tourism or has the potential to affect one or more aspects, such as economic, social, cultural, environmental sustainability, and others. For this reason, it is necessary to implement sustainable tourism development and management in this area. The development of the Lake Toba area means that management is not only centered on Lake Toba itself, but the city area that surrounds Lake Toba. Girsang Sipangan Bolon District, Simalungun Regency, is one of the entrance gates to Lake Toba and has an area of 126 km<sup>2</sup> with a population of 18,915 people. Parapat Village is the largest sub-district in this sub-district, and has long been famous for its tourism. Infrastructure facilities and infrastructure to support tourism have also been built since the 1990s. Various action plans are programmed to develop tourism in the area, initiated by the central government, local governments, and several agencies and agencies to support sustainable tourism in the area.

Referring to UNEP-UNWTO [5] and strengthened by the results of research by Lu & Nepal [6] which states that the definition and use of sustainability indicators is a major component in the process of planning and managing sustainable tourism, this research will use the main issues and indicators of development sustainable tourism in a tourist destination (Baseline Indicators Of Sustainable Tourism Development for Tourism Destination) by UNWTO [5]. One of the indicators of sustainable tourism is environmental issues, since the city of Parapat, which was dominated by the hotel and restaurant industry, has been hit by the issue of waste. Many hotels and restaurants are suspected of dumping waste in Lake Toba.

This study will examine the management of liquid waste in Girsang Sipangan Bolom District in an effort to support sustainable tourism in Lake Toba. The issue of liquid waste becomes important in an effort to overcome future problems regarding the image of positive destinations and the sustainability of biodiversity in the Lake Toba regional.

#### *Existing Condition of Wastewater Management in Girsang Sipangan Bolon District*

Currently, there are 2 (two) domestic wastewater treatment systems that are commonly used, namely the local sanitation system (on-site system) and the centralized sanitation system (off-site system). A centralized sanitation system is also called a piping system because to drain wastewater to be treated to a centralized installation and for its collection and distribution, a piping network is used. While in the local sanitation system, although pipes are used, the volume is very small, but the processing is individual/communal on a small scale.

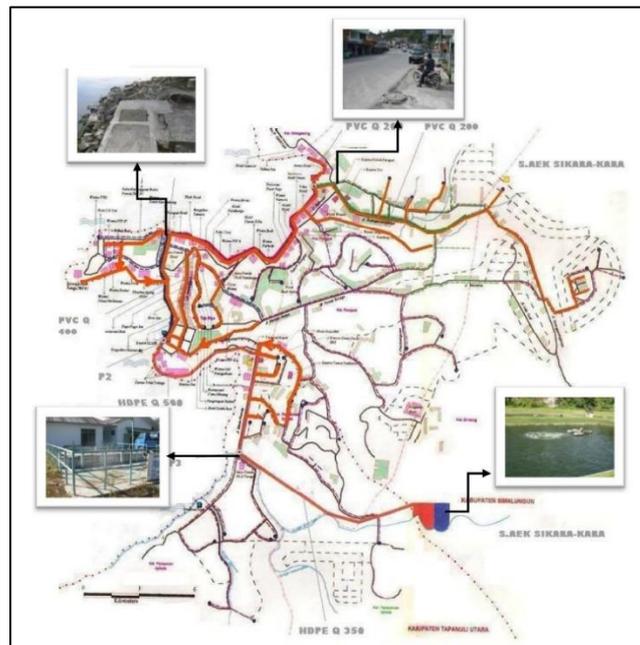
The condition of the wastewater management system in Simalungun Regency is basically a local (individual) sanitation service system. Currently, Simalungun Regency is not yet equipped with infrastructure facilities for STP (Stool Treatment Plant), but has several centralized systems (communal scale) and regional scale in Parapat District.

Table 1. Domestic Wastewater Service Coverage

No.	District	Open Defecatin (Households)	Improper Sanitation		Decent Sanitation					
			Onsite System							Offsite System
			Individual			Communal Based				Centralized
			Unsafe Septic Tank	Safe Septictank (HH)	MCK	Communal MCK ++	Communal Septictank	Communal IPAL	Home Connection	
1.	Girsang Sipangan Bolon	947	504	4677	2361	18	-	80	-	

Currently there is no IPLT operating in the Lake Toba area, and it can be assumed that the existing septic tanks still do not meet the technical requirements. The septic tank is never pumped out, which indicates the bottom of the septic tank is not watertight. Likewise with the existing communal WWTPs that have not been pumped because the communal WWTP technology still produces unstable sludge. In contrast to regional WWTPs, the technology used produces relatively stable sludge.

Parapat City off-site system was built starting in 2007, the construction was carried out in stages until 2000 with funding from foreign loans (JICA). After the construction was completed in 2010 this asset that has been built through the Governor of North Sumatra Province was handed over to PDAM Tirtanadi as the managing body until now. The WWTP is based in Ajibata, Simalungun Regency, The Ajibata WWTP service area includes Girsang Sipangan Bolon District, Simalungun Regency and Ajibata District, Toba Samosir Regency. Currently there are around 308 HC, consisting of 60 HC in Parapat, and 248 HC for Ajibata. There are 4 commercial accommodations between users from Parapat, namely Inna Parapat, Aek Sere, Darma Agung, and Riris Hotel.



**Figure 1** Condition of the network system and its infrastructure



**Figure 2** Regional IPAL of Ajibata

## 2 Research Method

This study uses descriptive methods, or research models, to carefully and in-depth study specific explanations / expressions and social phenomena without intervention or hypothesis [7]. The main data is qualitative because the main research approach used is qualitative. However, to complete the analysis of the qualitative data, quantitative data is also presented, with the understanding that this study uses a qualitative paradigm with the data. Explore and deepen social phenomena without making hypotheses. The main data is qualitative because the main research approach used is qualitative. However, quantitative data are also presented, with the understanding that this study uses a qualitative paradigm complemented by quantitative data to complete the qualitative data analysis.

### 3 Discussion and Result

The data at the research location shows that there is no seriousness of the relevant stakeholders to deal with this problem, even though Lake Toba is famous by nature and culture tourism. Nature and cultural tourism has become a major aspect in most tourist destinations, arguably accounts for around 40% of international tourism flows [8]. Standardized wastewater management system, except perhaps accommodation businesses (hotels) that have international standards such as the Niagara Hotel in Parapat. Although they could not show the data to the researcher, the informants were very confident in stating this condition. As an act of confirmation of information received by researchers from informants from previous government elements, in carrying out observations made on accommodation businesses around Lake Toba, it is indeed very difficult to find hotel businesses that already have waste treatment systems, such as swimming pools. storage and deposition before being released into the wastewater stream. Generally, accommodation businesses around Lake Toba (Parapat, Tomok, Tuk-tuk Siadong, Pangururan, Muara, Balige and Tongging) directly dispose of the remaining water from their activities directly into the sewer which empties into Lake Toba [9].

The sewage treatment plant (IPAL) has been under construction since 1996. The country has been in the village of Sijamble in the Ajibata district since 2000. The sewage treatment facility was constructed with a loan of IDR 7 billion from Japan's Overseas Economic Cooperation Fund (OECF). The planned service is to install domestic wastewater from the community of Parapat City, the capital of Gilsan Shipangamoron district in Simalungung province and Ajibata district in Toba Samosir province, at  $\pm$  15,000 m, 128 wells and 3 facilities. Is to manage through a plumbing system equipped with. Pumping station unit treated in a sewage treatment facility managed by PDAM Tirtanadi [10]. The WWTP was built using microbiological processes on an area of 2 hectares [11]. The designed wastewater treatment capacity is 2,000 m<sup>3</sup>/day or the equivalent of 3,000 household connections. There are several processing units consisting of: Aeration Pond, Facultative Pond and Maturation Pond. Each aeration and facultative pond is equipped with an aerator, while the maturation pond is not equipped with an aerator. The final product of the processing is channeled into the Sera-Sera River [12].

The problem is, out of a capacity of 3,000 connections that can be served by this system, only 300 connections (10%) use it [13]. This is due to the lack of public awareness, especially hotels and restaurants, to channel their waste water into the wastewater management system that has been provided and are more likely to dispose of it directly into Lake Toba. For the level of accommodation, based on the information received, it turns out that there are only 3 (hotels) that use these facilities, namely Aek Sere Hotel, Darma Agung Beach Hotel, and Inna Parapat Hotel.

#### 4 Conclusion

Solving the problem of waste issues in sustainable tourism can be overcome by implementing policy directions according to UNEP & UNWTO [14] namely by implementing policies to ensure the environment in the Lake Toba area with the following policy directions: (A) Reducing the use of chemicals that can harm the environment; (B) Reducing the discharge of waste into the environment and using a centralized waste disposal system; (C) Supervision and monitoring of newly established tourist facilities.

Solving problems in sustainable tourism development is a task for tourism stakeholders and the people who live and travel. The problems that arise also illustrate the lack of tourism management in tourist destinations [15].

#### REFERENCES

- [1] Arida, I. N. S., and Nyoman Sukma. "Buku Ajar: Pariwisata Berkelanjutan." Bali: Sustainpress. 2012.
- [2] Mahulae, Porman Juanda Marpomari. "Deskripsi Permasalahan Upaya Pengembangan Pariwisata Berkelanjutan di Danau Toba Sumatera Utara (Problem Description Of Sustainable Tourism Development Effort On Toba Lake North Sumatera)." *Inovasi* 16.1 (2019): 11-20.
- [3] Lumbanraja, Victor. "Tourism area life cycle in Lake Toba." *Indonesian Journal of Geography* 44.2 (2012): 150-160.
- [4] Manurung, P. Markus. "Membangun Pariwisata Yang Bermartabat dan Berkelanjutan Di Kawasan Danau Toba." Medan, Bina Media Perintis. 2016.
- [5] UNEP, WTO. "Making tourism more sustainable." A guide for policy makers. Paris and Madrid, UNEP and WTO 8. 2005.
- [6] Lu, Jiaying, and Sanjay K. Nepal. "Sustainable tourism research: An analysis of papers published in the Journal of Sustainable Tourism." *Journal of sustainable Tourism* 17.1 (2009): 5-16.
- [7] H. Noeng Muhadjir. *Metodologi Penelitian Kualitatif*. Yogyakarta. Rake Sarasin. 1996.
- [8] UNWTO. 2004. *Indicators of Sustainable Development for Tourism Destinations*.
- [9] Harefa, Mei Brilian, and Sufrial Hendri. "PENGEMBANGAN IPAL AJIBATA KAWASAN DANAU TOBA." *Jurnal Arsi Plan: Jurnal Ilmiah Arsitektur, Kota dan Wilayah* 1.1 (2020): 39-48.
- [10] Amala, K., S. Budhi, and H. Kusnopranto. "Cleaner production analysis at hospital wastewater treatment plant." *IOP Conference Series: Materials Science and Engineering*. Vol. 1041. No. 1. IOP Publishing, 2021.
- [11] *Integrated Tourism of Master Plan of Lake Toba, Rencana Pengembangan Kawasan Destinasi Wisata dan Kawasan Wisata Utama, Task G, versi 8 Juni 2020.*
- [12] *Integrated Tourism of Master Plan of Lake Toba, Rencana Pengembangan Kawasan Destinasi Wisata dan Kawasan Wisata Utama, Task F, versi 15 Juni 2020.*
- [13] *Baseline Analysis Report Book 2 Fact and Figures, Regional Infrastructure Development Agency Ministry of Public Works and Housing, version 9, published may 19<sup>th</sup>, 2020.*
- [14] *Baseline Analysis Report Book 2 Lake Toba Today, Regional Infrastructure Development Agency Ministry of Public Works and Housing, version 9, published may 19<sup>th</sup>, 2020.*
- [15] *Baseline Analysis Report Book 2 General Condition of Planning, Regional Infrastructure Development Agency Ministry of Public Works and Housing, version 9, published may 19<sup>th</sup>, 2020.*