



World Tourism Organization
International Network
of Sustainable Tourism
Observatories

ANNUAL REPORT 2022
MONITORING CENTRE FOR SUSTAINABLE TOURISM
OBSERVATORIES INSTO AND WINSTO
UNIVERSITAS SUMATERA UTARA
LAKE TOBA – Indonesia

1. Introduction

The Universitas Sumatera Utara (USU) Monitoring Centre for Sustainable Tourism Observatories (MCSTO) has been actively contributing to the sustainable development of tourism in Lake Toba since becoming a member of the UNWTO International Network of Sustainable Tourism Observatories (INSTO) in 2017. Initially, MCSTO USU focused its monitoring efforts on four villages in Pangururan Subdistrict, Samosir, before expanding in 2019 to cover thirty-one sub-districts, including both non-Key Tourism Areas (non-KTA) and Key Tourism Areas (KTA). This initiative aims to provide data-driven insights to support the achievement of Sustainable Development Goals (SDGs) and ensure that tourism development in the region remains sustainable and beneficial for local communities.

The COVID-19 pandemic significantly impacted tourism in Indonesia, necessitating adjustments to MCSTO USU's monitoring activities. Government-imposed restrictions on mobility in 2020 led to a temporary limitation of monitoring efforts to four Key Tourism Areas (Girsang Sipangan Bolon, Simanindo, Pangururan, and Balige). Despite these challenges, MCSTO USU continued to assess the sustainability of tourism in the region, adapting its methodologies to ensure reliable and consistent data collection during the pandemic period.

In 2021, MCSTO USU remains committed to enhancing its monitoring capabilities and contributing to global sustainable tourism initiatives. This year, the observatory continues its focus on the ten sustainability indicators: (1) Local satisfaction with tourism; (2) Destination economic benefits; (3) Employment; (4) Tourism seasonality; (5) Energy management; (6) Water management; (7) Wastewater management; (8) Solid waste management; (9) Governance; (10) Community participation in tourism. These efforts align with UNWTO's sustainability framework and support government strategies in fostering a more resilient and responsible tourism sector in Lake Toba.

2. Destination Profile

DESTINATION PROFILE			
		2020	2021
1	Tourism Satellite Account/s (TSA) in the destination country	☒ YES Last time a TSA was conducted:	☒ YES Last time a TSA was conducted:
2	Sector relevance: Contribution of (a) tourism and (b) other economic sectors to the local GDP (%) – latest figures	a) Tourism 7,1% b) Agriculture 45,36% c) Industry 13,9% Source: BPS of North Sumatera	a) Tourism 2,37% b) Agriculture 21,38% c) Industry 20,28% Source: BPS of North Sumatera
3	Arrivals of inbound (non-resident) visitors for last three years	☒ YES North Sumatera 2020: 44.400 2019: 258.822 2018: 236.431 Lake Toba Region 2020: 297 2019: 258.822 2018: 77.844 Source: BPS of North Sumatera	☒ YES North Sumatera 2021: 230 2020: 44.400 2019: 258.822 Lake Toba Region 2021: No Data 2020: 297 2019: 258.822 Source: BPS of North Sumatera
3 . 1	Percentage of total annual arrivals of inbound (non-resident) visitors occurring in peak month and in peak quarter (please indicate which month and quarter)	☒ YES 2020 = 6,74% (15.952) in January, 8,16% (19.286) in June, and 9,21% (21.787) in December. (Source: BPS of North Sumatera)	☒ YES 2021 = 4,78% (11) in January, 16,5% (38) in June, and 0% (0) in December. (Source: BPS of North Sumatera)
4	Trips of domestic visitors for the last three years		☒ YES Lake Toba Region 2021: 201.335 2020: 217.462 2019: 1.209.008 Source: BPS of Toba Region

DESTINATION PROFILE		
	2020	2021
5	Tourism industries: accommodation for visitors in hotel and similar establishments - Units ☒ YES North Sumatera Total rooms: 36.590 Total bed-space: 52.224 Lake Toba Region Total rooms: 5.143 Total bed-places: 10.460 Source: BPS of North Sumatera	☒ YES North Sumatera Total rooms: 34.638 Total bed-space: 48.672 Lake Toba Region Total rooms: 899 Total bed-places: 1.167 Source: BPS of North Sumatera
6	Current top 5 primary source markets for the destination ☒ YES Malaysia Singapore Netherlands China Germany Australia	☒ YES Malaysia Singapore China Germany France Netherlands
7	Research & Journal related to Sustainable Tourism Lecture Research & Journal 2020: 1 Student Research & Thesis 2020: 42	Lecture Research & Journal 2021: 0 Student Research & Thesis 2021: 3
8	Please describe the destination's experience with other monitoring initiatives/systems	In 2021, the monitoring continues on the whole lake's surroundings, which consists of 4 sub-districts.
9	Are there strategies in place for sustainable development of the destination? ☒ YES Name of those of relevance: STDev program of the Indonesian Ministry of Tourism.	☒ YES Name of those of relevance: STDev program of the Indonesian Ministry of Tourism.
10	DMO(s) in monitoring area: Yes/No and year of establishment ☒ YES Year of establishment: Badan Pelaksana Otorita Danau Toba / The Agency of Lake Toba Authority (2017); Badan Pengelola Geopark Kaldera Toba / The Management Board of Toba Caldera Geopark (2017)	☒ YES Year of establishment: Badan Pelaksana Otorita Danau Toba / The Agency of Lake Toba Authority (2017); Badan Pengelola Geopark Kaldera Toba / The Management Board of Toba Caldera Geopark (2017)

3. Findings, Reviews, and Performances of Issues and Indicators

3.1 Local Satisfaction

Data for 2021 is largely absent across locations, undermining any longitudinal understanding. The lack of regular, comprehensive data limits the ability to evaluate the true trajectory of community sentiment toward tourism.

Simanindo

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
1	Local Satisfaction	Level of satisfaction of local people with tourism	Likert scale average	4,50	3,50	No Data

Girsang Sipangan Bolon

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
1	Local Satisfaction	Level of satisfaction of local people with tourism	Likert scale average	No Data	3,8	No Data

Pangururan

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
1	Local Satisfaction	Level of satisfaction of local people with tourism	Likert scale average	No Data	3,64	No Data

Balige

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
1	Local Satisfaction	Level of satisfaction of local people with tourism	Likert scale average	4,7	4,85	No Data

Source: Observatory Report

3.2 Economic Benefits to the Destination

Tourism-related economic indicators generally show positive developments, although with some inconsistencies. The number of lodging businesses increased across three destinations, except in Balige, where it decreased from 32 to 30 businesses. Pangururan experienced a substantial surge in certified businesses, growing from 144 to 428. Girsang Sipangan Bolon saw its tourism GDP nearly double from Rp 231,43 million in 2020 to Rp 335,35 million in 2021. However, budget allocations and some key indicators were missing for 2021 in several areas, limiting comprehensive comparison. Overall, tourism's economic impact appears to be growing but unevenly documented.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
2	Economic Benefits for Destinations	Number of Tourism Services (Bureau/Travel Agent)	Business unit	17	17	17
		Number of Tourism Objects managed by Non-Government	Business unit	21	21	21
		Number of Lodging (Hotel, Cottage, Guesthouse, Villa Motel)	Business unit	74	89	90

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
		Total number of rooms for rent (room)	Room	No Data	No Data	1.647
		The number of Food Business Places (restaurants, Café, etc.)	Business unit	68	83	77
		Number of certified/ licensed Lodging, Dining, and Tourist Attractions	Business unit	59	No Data	191
		Local Gross Regional Domestic Product (GDP)	Rp	4.434.720.000	4.542.850.000	4.755.230.000
		Gross Regional Domestic Product (GDP) from the Tourism sector	Rp	236.940.000	231.430.000	232.900.000
		Total local development budget	Rp	No Data	No Data	879.645.686.223
		Development budget in support of the tourism sector	Rp	No Data	6.111.794.513	3.412.470.944

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
2	Economic Benefits for Destinations	Number of Tourism Services (Bureau/Travel Agent)	Business unit	6	5	5
		Number of Tourism Objects managed by Non-Government	Business unit	16	18	18
		Number of Lodging (Hotel, Cottage, Guesthouse, Villa Motel)	Business unit	55	54	74
		Total number of rooms for rent (room)	Room	2.480	1.876	No Data
		The number of Food Business Places (restaurants, Café, etc.)	Business unit	266	286	No Data
		Number of certified/ licensed Lodging, Dining, and Tourist Attractions	Business unit	71	71	71
		Local Gross Regional Domestic Product (GDP)	Rp	27.348.700.000	39.441.350.000	42.576.880.000
		Gross Regional Domestic Product (GDP) from the Tourism sector	Rp	240.530.000	231.430.000	335.350.000
		Total local development budget	Rp	1.700.748.000	1.383.829.793	No Data
		Development budget in support of the tourism sector	Rp	11.716.810.353	3.400.959.272	No Data

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
2	Economic Benefits for Destinations	Number of Tourism Services (Bureau/Travel Agent)	Business unit	10	9	9
		Number of Tourism Objects managed by Non-Government	Business unit	12	11	11
		Number of Lodging (Hotel, Cottage, Guesthouse, Villa Motel)	Business unit	23	22	42
		Total number of rooms for rent (room)	Room	371	362	505
		The number of Food Business Places (restaurants, Café, etc.)	Business unit	114	111	375
		Number of certified/ licensed Lodging, Dining, and Tourist Attractions	Business unit	90	144	428
		Local Gross Regional Domestic Product (GDP)	Rp	4.085.202.000	4.542.850.000	4.542.850.000
		Gross Regional Domestic Product (GDP) from the Tourism sector	Rp	213.794.000	231.430.000	No Data
		Total local development budget	Rp	13.495.226.839	9.993.428.804	8.796.456.862
		Development budget in support of the tourism sector	Rp	11.776.152.000	8.480.252.874	3.412.470.944

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
2	Economic Benefits for Destinations	Number of Tourism Services (Bureau/Travel Agent)	Business unit	24	10	15
		Number of Tourism Objects managed by Non-Government	Business unit	18	18	18
		Number of Lodging (Hotel, Cottage, Guesthouse, Villa Motel)	Business unit	35	32	30
		Total number of rooms for rent (room)	Room	390	385	417
		The number of Food Business Places (restaurants, Café, etc.)	Business unit	180	175	94
		Number of certified/ licensed Lodging, Dining, and Tourist Attractions	Business unit	123	120	No Data
		Local Gross Regional Domestic Product (GDP)	Rp	4.463.720.000	4.532.850.000	5.649.100.000

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
		Gross Regional Domestic Product (GDP) from the Tourism sector	Rp	236.794.000	231.430.000	No Data
		Total local development budget	Rp	13.495.226.839	9.993.428.804	No Data
		Development budget in support of the tourism sector	Rp	11.776.152.000	8.480.252.874	14.549.286.980

Source: BPS of North Sumatra

3.3 Employment

The number of workers in the tourism sector has increased in two districts, but has significantly risen in Simanindo District. Despite the increase, tourists' perceptions of worker services in the tourism sector from 2020 to 2021 decreased (0,59 points) in Simanindo and plummeted (1,26) in Pangururan. However, many datasets, particularly for 2021, are incomplete, especially in Balige.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
3	Employment	Total number of workers in the tourism sector	Person	4.907	5.162	21.574
		Number of local people working in the tourism sector	Person	4.527	4.762	19.904
		Number of female workers in the tourism sector	Person	No Data	No Data	11.844
		Tourist perceptions of worker services in the tourism sector	Likert scale average	4,32	3,93	3,34

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
3	Employment	Total number of workers in the tourism sector	Person	416.910	439.251	449.676
		Number of local people working in the tourism sector	Person	49.943	53.257	No Data
		Number of female workers in the tourism sector	Person	179.804	182.159	188.351
		Tourist perceptions of worker services in the tourism sector	Likert scale average	No Data	3,59	No Data

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
3	Employment	Total number of workers in the tourism sector	Person	83	94	No Data
		Number of local people working in the tourism sector	Person	62	74	No Data
		Number of female workers in the tourism sector	Person	41	46	No Data

		Tourist perceptions of worker services in the tourism sector	Likert scale average	No Data	4,6	3,34
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Balige

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
3	Employment	Total number of workers in the tourism sector	Person	33.400	32.930	No Data
		Number of local people working in the tourism sector	Person	30.047	29.624	No Data
		Number of female workers in the tourism sector	Person	No Data	22.682	No Data
		Tourist perceptions of worker services in the tourism sector	Likert scale average	4,8	4,8	No Data

Source: BPS of North Sumatera

3.4 Seasonal Tourism

Seasonal visitation trends display substantial growth in some areas, especially Girsang Sipangan Bolon, where domestic and foreign tourism surged from 2020 to 2021. In contrast, Balige has been suffering significant declines in domestic tourism since 2019 (-64,55% annual decline rate). Every destination experienced a decrease in room occupancy from 2020 to 2021, except Balige which surged from 8,31% to 20,45%.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
4	Seasonal Tourism	Domestic tourists visit	Person	367.301	402.295	402.295
		Number of foreign tourist visits	Person	50.970	2.908	2.908
		The average number of rooms occupied by tourists per month	%	13,22	16,46	15,17
		Tourist perception of seasonal tourism	Likert scale average	No Data	3,95	No Data

Girsang Sipangan Bolon

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
4	Seasonal Tourism	Domestic tourists visit	Person	119.756	142.361	717.714
		Number of foreign tourist visits	Person	13.218	117	44.746
		The average number of rooms occupied by tourists per month	%	24,8	18,76	11,02
		Tourist perception of seasonal tourism	Likert scale average	No Data	3,83	No Data

Pangururan

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
4	Seasonal Tourism	Domestic tourists visit	Person	367.301	402.295	442.565
		Number of foreign tourist visits	Person	50.970	2.908	0
		The average number of rooms occupied by tourists per month	%	13,22	16,46	15,17

		Tourist perception of seasonal tourism	Likert scale average	No Data	4,5	No Data
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Balige

No.	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
4	Seasonal Tourism	Domestic tourists visit	Person	801.001	217.683	100.667
		Number of foreign tourist visits	Person	1.611	0	0
		The average number of rooms occupied by tourists per month	%	23,19	8,31	20,45
		Tourist perception of seasonal tourism	Likert scale average	4,5	4,2	No Data

Source: BPS of North Sumatra

3.5 Governance

Each sub-district has developed a plan and strategy for its tourism destination and has conducted documented activities for monitoring, educating, and promoting. However, implementation varies: in 2021, Simanindo increased tourism monitoring activities from 1 to 4. Both Simanindo and Pangururan had started monitoring and educating on climate change in 2021. Despite the increase in activities across destinations, Girsang Sipangan Bolon reported a decrease in tourism promotion from 8 to 6 in 2021, and a sharp decline in the number of organisations managing sustainable tourism in the area (from 9 to 4 in 2021).

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
5	Governance	Multi-year destination development plan or strategy	Yes/No	Yes	Yes	Yes
		Number of organisations responsible for coordinating the management of sustainable tourism	Organisation	4	4	4
		Number of tourism monitoring in one year	Activity	1	1	4
		Number of climate change education activities in one year	Activity	0	0	3
		Number of assets and tourist attractions inventoried	Object	23	23	23
		Number of tourism promotion activities in one year	Activity	10	10	12

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
5	Governance	Multi-year destination development plan or strategy	Yes/No	Yes	Yes	Yes
		Number of organisations responsible for coordinating the management of sustainable tourism	Organisation	8	9	4
		Number of tourism monitoring in one year	Activity	4	2	4
		Number of climate change education activities in one year	Activity	0	0	0

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
		Number of assets and tourist attractions inventoried	Object	16	16	23
		Number of tourism promotion activities in one year	Activity	12	8	6

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
5	Governance	Multi-year destination development plan or strategy	Yes/No	Yes	Yes	Yes
		Number of organisations responsible for coordinating the management of sustainable tourism	Organisation	4	4	4
		Number of tourism monitoring in one year	Activity	4	4	5
		Number of climate change education activities in one year	Activity	No Data	0	2
		Number of assets and tourist attractions inventoried	Object	5	5	5
		Number of tourism promotion activities in one year	Activity	10	10	10

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
5	Governance	Multi-year destination development plan or strategy	Yes/No	Yes	Yes	Yes
		Number of organisations responsible for coordinating the management of sustainable tourism	Organisation	7	7	7
		Number of tourism monitoring in one year	Activity	15	2	No Data
		Number of climate change education activities in one year	Activity	0	0	No Data
		Number of assets and tourist attractions inventoried	Object	7	7	No Data
		Number of tourism promotion activities in one year	Activity	12	16	No Data

Source: BPS of North Sumatra

3.6 Community Participation in Tourism

Efforts to enhance community participation have been recorded in 2019 and 2020. Pangururan and Balige showcase an institutional approach, with 41 educational institutions integrating sustainability into curricula. Despite these initiatives, most indicators are stagnant or missing in 2021, indicating a need for stronger engagement frameworks and consistent monitoring.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
6	Community participation in tourism	Number of educational activities on the benefits of tourism and community assistance in one year	Activity	4	4	No Data
		Percentage of people who understand the concept of sustainable tourism development	%	0	2,8	No Data
		Availability of information on sustainable tourism development that is easily accessible to the public	Yes/No	Yes	Yes	Yes
		Number of educational programs/ institutions that incorporate sustainable tourism learning into the curriculum;	Institutional unit	0	0	0
		Perceptions of the issue of community participation in tourism	Likert scale average	No Data	3,79	No Data

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
6	Community participation in tourism	Number of educational activities on the benefits of tourism and community assistance in one year	Activity	6	7	No Data
		Percentage of people who understand the concept of sustainable tourism development	%	No Data	3,56	No Data
		Availability of information on sustainable tourism development that is easily accessible to the public	Yes/No	Yes	Yes	Yes
		Number of educational programs/ institutions that incorporate sustainable tourism learning into the curriculum;	Institutional unit	0	0	0
		Perceptions of the issue of community participation in tourism	Likert scale average	No Data	3,87	No Data

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
6	Community participation in tourism	Number of educational activities on the benefits of tourism and community assistance in one year	Activity	No Data	No Data	No Data
		Percentage of people who understand the concept of sustainable tourism development	%	No Data	No Data	No Data

		Availability of information on sustainable tourism development that is easily accessible to the public	Yes/No	Yes	Yes	Yes
		Number of educational programs/institutions that incorporate sustainable tourism learning into the curriculum;	Institutional unit	41	41	41
		Perceptions of the issue of community participation in tourism	Likert scale average	No Data	4,44	No Data

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
6	Community participation in tourism	Number of educational activities on the benefits of tourism and community assistance in one year	Activity	12	5	No Data
		Percentage of people who understand the concept of sustainable tourism development	%	65	65	No Data
		Availability of information on sustainable tourism development that is easily accessible to the public	Yes/No	Yes	Yes	Yes
		Number of educational programs/institutions that incorporate sustainable tourism learning into the curriculum;	Institutional unit	41	41	41
		Perceptions of the issue of community participation in tourism	Likert scale average	No Data	4,44	No Data

Source: BPS of North Sumatra

3.7 Energy Management

Energy consumption data shows divergent patterns, with Simanindo and Pangururan maintaining low, stable daily consumption (0,46 kWh/person/hour). At the same time, Girsang Sipangan Bolon and Balige reported spikes, notably Balige, which jumped from 0,46 to 2,55 kWh/person/hour in 2021. Participation in energy conservation programs is absent in Simanindo and Girsang Sipangan Bolon, while renewable energy adoption remains minimal. The lack of conservation efforts underscores the urgent need for regulatory intervention and industry incentives to advance sustainable energy practices across each district.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
7	Energy Management	Energy Consumption in a day	kWh/Org/Hr	0,61	0,63	0,46
		Number of business units participating in energy conservation programs	Business Unit	0	0	0
		Number of business units in the tourism sector that use energy from renewable resources	Business Unit	2	2	2

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
7	Energy Management	Energy Consumption in a day	kWh/Org/Hr	0,05	0,63	2,36
		Number of business units participating in energy conservation programs	Business Unit	0	0	0
		Number of business units in the tourism sector that use energy from renewable resources	Business Unit	0	0	2

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
7	Energy Management	Energy Consumption in a day	kWh/Org/Hr	0,63	0,65	0,46
		Number of business units participating in energy conservation programs	Business Unit	No Data	No Data	1
		Number of business units in the tourism sector that use energy from renewable resources	Business Unit	1	1	1

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
7	Energy Management	Energy Consumption in a day	kWh/Org/Hr	0,46	0,46	2,55
		Number of business units participating in energy conservation programs	Business Unit	442	451	No Data
		Number of business units in the tourism sector that use energy from renewable resources	Business Unit	0	0	0

Source: BPS of North Sumatra

3.8 Water Management

Water use has escalated in most destinations, with Simanindo increasing from 86,85 to 139 litres/person/day between 2020 and 2021, and Girsang Sipangan Bolon reaching 191 litres from 108 litres in 2020. However, recycled water use remains at 0%, and water treatment infrastructure is virtually nonexistent. Balige is an exception, with 112 facilities equipped for water recycling. Nevertheless, the absence of sustainable water practices in each destination threatens long-term resilience.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
8	Water Management	Daily use of clean water	Litres/Person /Day	92,88	86,85	139
		Percentage of recycled water use	%	0	0	0
		Number of tourism facilities that have recycled water	Business unit	0	0	0

		Number of tourism facilities that already have access to clean drinking water	Business unit	0	0	0
		Travellers' Perceptions of Water Quality	Likert scale average	3,53	3,70	No Data

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
8	Water Management	Daily use of clean water	Litres/Person /Day	107	108	191
		Percentage of recycled water use	%	0	0	0
		Number of tourism facilities that have recycled water	Business unit	0	0	0
		Number of tourism facilities that already have access to clean drinking water	Business unit	78	53	53
		Travellers' Perceptions of Water Quality	Likert scale average	No Data	3,44	No Data

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
8	Water Management	Daily use of clean water	Litres/Person /Day	107	108	123
		Percentage of recycled water use	%	92,88	86,85	No Data
		Number of tourism facilities that have recycled water	Business unit	No Data	No Data	No Data
		Number of tourism facilities that already have access to clean drinking water	Business unit	No Data	No Data	No Data
		Travellers' Perceptions of Water Quality	Likert scale average	2,39	2,42	No Data

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
8	Water Management	Daily use of clean water	Litres/Person /Day	0,15	0,12	133
		Percentage of recycled water use	%	28	28	No Data
		Number of tourism facilities that have recycled water	Business unit	112	112	112
		Number of tourism facilities that already have access to clean drinking water	Business unit	204	195	No Data
		Travellers' Perceptions of Water Quality	Likert scale average	4,5	4,2	No Data

Source: BPS of North Sumatra

3.9 Liquid Waste Management

While treatment levels have remained constant in Simanindo and Pangururan, Girsang Sipangan Bolon continues to report zero treatment. There has been no increase in the number of tourism-sector businesses installing water treatment systems across districts. From 2019 to 2020, the amount of liquid waste per day decreased in three regions, except in Simanindo, which experienced a 22% increase. However, the lack of updated data across destinations in 2021 makes it challenging to evaluate improvements or setbacks.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
9	Liquid Waste Management	The amount of liquid waste from the tourism sector	Litres/Day	88.288	108.091	No Data
		The amount of liquid waste from the tourism sector receiving treatment (liquid waste treatment)	Litres/Day	639,36	639,36	639,36
		Number of business units in the tourism sector that implement a water treatment system	Business unit	37	37	37

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
9	Liquid Waste Management	The amount of liquid waste from the tourism sector	Litres/Day	206.008	159.788	No Data
		The amount of liquid waste from the tourism sector receiving treatment (liquid waste treatment)	Litres/Day	0	0	0
		Number of business units in the tourism sector that implement a water treatment system	Business unit	4	4	4

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
9	Liquid Waste Management	The amount of liquid waste from the tourism sector	Litres/Day	158.381	155.706	No Data
		The amount of liquid waste from the tourism sector receiving treatment (liquid waste treatment)	Litres/Day	656,64	656,64	656,64
		Number of business units in the tourism sector that implement a water treatment system	Business unit	38	38	38

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
9	Liquid Waste Management	The amount of liquid waste from the tourism sector	Litres/Day	137.586	78.960,5	No Data
		The amount of liquid waste from the tourism sector receiving treatment (liquid waste treatment)	Litres/Day	0.105	0.084	0.084

		Number of business units in the tourism sector that implement a water treatment system	Business unit	1	1	1
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Source: BPS of North Sumatra

3.10 Solid Waste Management

The volume of waste data for 2021 was unattainable in each district, limiting the ability to evaluate the quality of solid waste management. Business participation in waste segregation and recycling is limited: with Girsang Sipangan Bolon reporting 6 businesses that implement waste type segregation and 10 businesses in Balige participating in recycling waste. The overall data reflects minimal progress and insufficient monitoring.

Simanindo

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
10	Solid Waste Management	The volume of waste generated by the destination	Tons/ Month	80,84	82,5	No Data
		Number of business units in the tourism sector that implement waste type segregation	Business unit	2	2	2
		Number of tourism sector business units that recycle waste	Business unit	0	0	0
		Tourist perceptions of the image of the cleanliness of the destination	Likert scale average	No Data	3,47	No Data

Girsang Sipangan Bolon

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
10	Solid Waste Management	The volume of waste generated by the destination	Tons/ Month	287,70	294,3	No Data
		Number of business units in the tourism sector that implement waste type segregation	Business unit	6	6	6
		Number of tourism sector business units that recycle waste	Business unit	0	0	0
		Tourist perceptions of the image of the cleanliness of the destination	Likert scale average	No Data	3,16	No Data

Pangururan

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
10	Solid Waste Management	The volume of waste generated by the destination	Tons/ Month	98,88	96,32	No Data
		Number of business units in the tourism sector that implement waste type segregation	Business unit	2	2	2
		Number of tourism sector business units that recycle waste	Business unit	No Data	No Data	No Data

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
		Tourist perceptions of the image of the cleanliness of the destination	Likert scale average	No Data	3,47	No Data

Balige

No	Monitoring Issue	Baseline Indicator	Unit	Value		
				2019	2020	2021
10	Solid Waste Management	The volume of waste generated by the destination	Tons/ Month	165,65	122,8	No Data
		Number of business units in the tourism sector that implement waste type segregation	Business unit	1	1	1
		Number of tourism sector business units that recycle waste	Business unit	7	10	10
		Tourist perceptions of the image of the cleanliness of the destination	Likert scale average	4,50	4,58	No Data

Source: BPS of North Sumatra