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SANITATION INSPECTION OF SAMARINDA THEME PARK IN SAMARINDA, EAST KALIMANTAN

Zalfa Rania Muyassarah[1)*], Raisah Miza Almas[1)], Ashri Rahmaya Nur[1)], Wanda Gustia[1)], Arya Yuliansyah Putra[1)], Muhammad Aidil Fitrah[1)*]

[1)] *Department of Environmental Health, Faculty of Public Health, Mulawarman University, Samarinda, Indonesia*

*Corresponding Author: aidilfitrah@fkm.unmul.ac.id

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ABSTRACT

Background: This study aimed to assess sanitation conditions at Samarinda Theme Park based on applicable environmental health standards. This initiative was driven by the potential for increased disease transmission risks in recreational areas due to poor sanitation and high visitor interaction. Therefore, the objective was to assess the condition of sanitation facilities and air quality at Samarinda Theme Park to address gaps identified in existing literature.

Methods: This study employed a descriptive qualitative method to describe environmental sanitation conditions at Samarinda Theme Park on May 5, 2026. Data were collected through observation, environmental measurements, interviews, and documentation, utilizing a Public Facility Sanitation checklist based on the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023.

Results: The results indicate that the overall sanitation condition of Samarinda Theme Park falls into the "good" category, with a score of 88,07%. Overall, all components regarding the environment and main facilities achieved the maximum score (100%), whereas the wastewater disposal component required improvement, scoring 87,5%. Regarding air quality, $PM_{2,5}$ levels at all sampling points complied with quality standards; however, one indoor location (Point 2) exceeded the standard, reaching 101 $\mu g/m^3$.

Conclusion: This study found that Samarinda Theme Park meets environmental health standards and highlights the importance of proper sanitation, facilities, and air quality management in maintaining a healthy recreational environment. Further research should explore wastewater management, air quality, and other environmental health factors in greater detail.

KEYWORDS: Inspection; Public Places; Recreation Area; Sanitation; WASH

1. Introduction

Clean water and proper sanitation are important concerns in efforts to achieve sustainable development as reflected in the 2030 Sustainable Development Goals (SDGs) agenda, specifically in Goal 6 which emphasizes the importance of ensuring access to clean water along with safe and sustainable sanitation management for all communities (Fatristya et al., 2025). UNICEF in 2024 stated that diseases related to unsafe drinking water, sanitation, and hygiene cause millions of deaths since as many as 2,2 billion people worldwide do not have safe drinking water and 4,2 billion people have limited access to safe and proper

sanitation services. Humans worldwide require access to clean water and proper sanitation, including in public areas, as facilities that fail to adhere with health regulations can raise the risk of disease transmission within the community.

Sanitation of public places is an effort to prevent health impacts through monitoring activities in public places that are closely related to disease transmission (Adifa et al., 2025). Public place sanitation needs to receive attention in the realm of public health because public places are used as a meeting place for various types of people with different health conditions, so if they are not maintained properly, they can cause the risk of various health problems and diseases (Izwara et al., 2023; Herwianti S Wijayanti, 2023). Sanitation supervision in public places is a strategic preventive measure in the primary health care system (Yusmidiarti S Adeko, 2025). One example of sanitation in public places is recreation areas. Based on Health Ministerial Regulation No. 2 of 2023, Chapter 2, Article 3, states that recreation areas can include children's playgrounds, cinemas, tourist attractions, and other recreational areas.

Recreational areas include gathering places for people to relieve stress, refresh, have healing time, and spend time with family before finally returning to their daily routines. Recreational areas at certain times can experience an increase in the number of tourists, resulting in increased interaction between tourists. Based on Law Number 10 of 2009 concerning Tourism, a tourist is an individual or group of people who travel by visiting a particular place for recreational purposes (Dwipa et al., 2025). According to Susilawati et al. (2025), recreational areas can potentially become locations for the spread of disease due to the high level of human interaction and activity that takes place there if not supported by good sanitation management.

Sanitation in recreational areas is important to maintain a clean and healthy environment and prevent the spread of disease. Good sanitation in recreational areas will make visitors comfortable, increase visitor appeal and satisfaction, and make the recreational areas public space with adequate facilities. The Indonesian government previously targeted achieving 90% access to proper sanitation, which includes 15% access to safe sanitation, in the 2020–2024 National Medium-Term Development Plan (RPJMN) as an effort to realize global goals in the field of sanitation (Widyastuti et al., 2023). Based on the results of observations conducted by Susilawati et al. (2025) at the Central Park Zoo S Resort recreation area, the percentage score was 88,54%, indicating that this recreation area is categorized as healthy. The components assessed in their observations have met applicable health standards, although several components still require improvement to improve sanitation quality. Since sanitation is important in recreational areas, an observation was conducted at the Samarinda Theme Park recreation area to determine and assess the sanitation conditions of the recreation area in Samarinda Theme Park, Samarinda City, based on applicable environmental health standards.

2. Methods

This study was conducted at Samarinda Theme Park, Samarinda City, East Kalimantan, on May 5, 2026. A qualitative descriptive method was employed to describe environmental sanitation conditions based on actual field observations, without applying any interventions to the study subjects.

Data collection involved direct observation, measurement of environmental parameters, interviews, and documentation. Sanitation observations utilized a Public Facility Sanitation (STTU) checklist based on the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023 concerning Environmental Health. The sanitation assessment covered three categories: Category I (environmental and grounds conditions), Category II (basic sanitation facilities), and Category III (health and safety support facilities). Assessments were based on the actual condition of the sanitation facilities available at Samarinda Theme Park.

Environmental parameter measurements were taken at four observation points, two indoors and two outdoors, within Samarinda Theme Park. Measured parameters included $PM_{2,5}$ and PM_{10} airborne particulate concentrations, air temperature, and humidity, using a dust detector. Sampling was conducted between 16:00 and 17:00 WITA to capture environmental quality conditions during visitor activity. Prior to use, the physical condition and operational functionality of the measuring instruments were inspected to ensure proper performance during data collection.

Observation points were selected to represent areas of visitor activity and key facilities available at Samarinda Theme Park. Documentation was gathered to provide supporting data illustrating the sanitation and environmental conditions at the study site. Data obtained from observations, environmental parameter measurements, and documentation were analyzed descriptively by comparing the observed sanitation conditions against applicable environmental health standards. The analysis results are presented to describe the sanitation and environmental quality at Samarinda Theme Park.

3. Result

This study is a descriptive observational study with a cross-sectional approach conducted at the Samarinda Theme Park tourist attraction, Samarinda City, East Kalimantan Province (Sari et al., 2022). Sanitation inspections were carried out directly using field inspections based on standard form of sanitation inspections for public places referring to the Minister of Health Regulation Number 2 of 2023 concerning Implementing Regulations for Government Regulation Number 66 of 2014 concerning Environmental Health (Charisma et al., 2025). Air quality measurements (temperature, humidity, $PM_{2,5}$, and PM_{10}) were carried out at two outdoor and two indoor points in the theme park area (Zając et al., 2024). This study is comprehensive because it includes components of the physical environment, sanitation facilities, health facilities, and ambient air quality in an integrated manner (Sari et

al., 2022; Charisma et al., 2025). This study did not involve direct human participants but instead focused on assessing the sanitation and physical environmental conditions of tourist attractions (Sari et al., 2022). Data were obtained through direct observation, measuring physical air parameters, and scoring sanitation components based on established standards (Charisma et al., 2025). The assessment covered eight main components: environment, clean water, public toilets, wastewater disposal, garbage disposal, education facilities, health facilities, and fire extinguishers (Sari et al., 2022).

a. Environmental Aspects

Table 1. Results of the Sanitation Inspection of the Environmental Components of Samarinda Theme Park

No	Assessed Components		
	Environmental Aspects	**Total Score**	**Maximum Score**
1.	Cleanliness	32	32
2.	Absence of Puddles	24	24
3.	Smooth wastewater flow	24	24

Table 1 shows that Samarinda Theme Park's environmental component received a total score of 80 out of a maximum of 80, indicating that all environmental subcomponents were fully met. The tourist area was clean, there were no puddles, and the wastewater system was functioning smoothly. The absence of standing water in the area is particularly significant from a public health standpoint, given that the presence of stagnant water has been identified as a significant risk factor for dengue virus transmission, with an odds ratio of 5,02 among communities in Indonesia (Widyasari et al., 2024).

b. Sanitation Facilities

The results of data processing for sanitation facilities in the Sanitation Inspection of the Samarinda Theme Park Tourist Attraction can be seen in table 2 below:

Table 2. Sanitation Inspection Results for Clean Water Components, Public Toilets, Wastewater Disposal, Garbage Disposal

No	Assessment Components	Total Score	Maximum Score
	Clean Water		
1.	Available in sufficient quantities	64	64
2.	Meet physical requirements	48	48
3.	Sufficient taps are available (minimum 1 tap for a radius of 20m)	48	48

No	Assessment Components	Total Score	Maximum Score
	Public Toilet		
1.	Clean and well-maintained	48	48
2.	The toilet is connected to the city's sewage system or septic tank.	32	32
3.	The number of toilets is as follows: one toilet for every 80 female visitors and one toilet for every 100 male visitors	32	32
4.	Men's toilets are separate from women's toilets	32	32
	Wastewater Disposal		
1.	Doing own processing or urban processing.	32	32
2.	Channeled via closed channels, watertight and smooth	80	96
	Waste Disposal		
1.	There are sufficient trash bins available (minimum 1 trash bin for every 20m radius).	42	42
2.	Strong, rust-resistant, waterproof, smooth and flat surface, covered.	42	42
3.	Available trash polling stations (TPS) that meet the requirements	28	28
4.	Waste transportation from the TPS to the landfill (TPA) is carried out at least once every three days	28	28

Table 2 shows that the sanitation facilities component obtained a total score of 556 out of a maximum score of 604. Almost all subcomponents were fulfilled perfectly, except for the wastewater disposal subcomponent, especially the closed channel aspect, which only obtained a score of 80 out of a maximum of 96. This shows that wastewater drainage management still needs to be improved.

c. Other Components

The results of data processing for other components in the Samarinda Theme Park tourist area can be seen in the following table:

Table 3. Inspection Results of Extension Facility Components, Health Facilities/Instruments, and Fire Extinguishers

No	Assessment Component	Total Score	Maximum Score
	Extension Facilities		
1.	There are sanitation signs (slogans, posters, etc.)	72	72
2.	Loudspeakers are available to provide information/information.	48	48
	Health Facilities		
1.	Availability of polyclinic/treatment center	72	72
2.	Minimum 1 first aid kit containing simple medications is available.	48	48
	Fire Extinguisher		
1.	There are fire extinguishers that function properly and are easily accessible	48	48
2.	There is an explanation about its use	32	32

Table 3 shows that other components, namely extension facilities, health facilities, and fire extinguishers, all met the maximum score of 320 out of 320. This is a very good achievement in the aspect of preparedness and health promotion in the tourism environment.

d. Recapitulation of Calculation Results for All Components of the Samarinda Theme Park Sanitation Inspection Assessment

Table 4. Calculation Results for Each Component of the Sanitation Inspection Assessment of the Samarinda Theme Park Tourist Attraction

No.	Assessed Components	Total Score	Maximum Score
1.	Environment	80	80
2.	Clean water	160	160
3.	Public toilet	144	144
4.	Wastewater disposal	112	128
5.	Garbage disposal	140	140
6.	Extension facilities	120	120

No.	Assessed Components	Total Score	Maximum Score
7.	Health facilities	120	120
8.	Fire extinguisher	80	80
	Overall Score	876	972

Based on Table 4, the total sanitation inspection score for Samarinda Theme Park was 856 out of a maximum score of 972, equivalent to 88,07%. Based on the sanitation inspection assessment classification for public places, this score places Samarinda Theme Park in the good category. The components closest to a perfect score were the environment, clean water, public restrooms, waste disposal, outreach facilities, health facilities, and fire extinguishers. The only component with a deficit score was wastewater disposal (112 out of 128), specifically the closed drainage system aspect.

e. Air Quality Measurement Results

Table 5. Results of Temperature, Humidity, $PM_{2,5}$ and PM_{10} Measurements

Parameter Standards	Average Sample Outdoor	Ambient Air Quality Standard	Average Sample Indoor	Indoor Air Quality Standard
Temprature	26,74°C	20 - 30°C	27,55°C	18 - 30°C
Humidity	92,20%	40 - 70 %	47,85%	40 - 60 %
$PM_{2,5}$	14,5 µg/m3	55 µg/m3 (24 hours)	5,5 µg/m3	25 µg/m3 (24 hours)
PM_{10}	59 µg/m3	75 µg/m3 (24 hours)	52,5 µg/m3	70 µg/m3 (24 hours)

Based on air quality measurements at Samarinda Theme Park, temperature readings in both outdoor (26,74°C) and indoor (27,55°C) areas remain within established standard ranges. Outdoor humidity (92,20%) exceeds the standard (40–70%), whereas indoor humidity (47,85%) remains within the standard. High outdoor humidity may be attributed to the open-air environment and local climatic factors.

Particulate matter measurements indicate that $PM_{2,5}$ concentrations in both outdoor (14,5 µg/m^3) and indoor (5,5 µg/m^3) areas remain below the standard limits. Similarly, PM_{10} levels were 59 µg/m^3 outdoors and 52,5 µg/m^3 indoors, comply with air quality limits.

Overall, air quality at Samarinda Theme Park remains good; however, outdoor humidity is a parameter that warrants attention, as it exceeds the established standard.

4. Discussion

Research results indicate that the overall sanitation condition of Samarinda Amusement Park falls into the "good" category, with a score of 88,07% (856/972). This achievement demonstrates that the attraction's management has implemented environmental sanitation maintenance efforts with reasonable consistency. Successfully maintaining perfect scores across seven of the eight key components reflects management's commitment to upholding applicable environmental health standards (Oktaviani et al., 2025; Yusmidiarti & Adeko, 2025).

The most notable findings concern air quality parameters: outdoor humidity significantly exceeded the upper limit, and indoor PM_{10} levels surpassed quality standards. The elevated PM_{10} levels at indoor sampling point 2 that located at one of the food stalls may be attributed to cooking activities that frequently generate smoke. Furthermore, high-temperature cooking methods, such as deep-frying and sautéing, produce significantly higher PM_{10} emissions, with emission levels rising alongside cooking temperatures (Tang et al., 2024). Additionally, the high humidity may stem from factors such as the conditions during sampling, specifically, that samples were collected shortly after the rain had stopped. Other contributing factors include the geographical and microclimatic conditions of Samarinda City, which is situated in a humid tropical zone with high rainfall, as well as the surrounding vegetation, which influences air circulation and local evapotranspiration (Staryo et al., 2024).

The combination of high particulate levels and humidity can create an environment conducive to the proliferation of indoor bioaerosols and pathogenic microorganisms, a risk often overlooked during routine monitoring in conventional sanitation inspections. This condition should be interpreted not only as a technical finding but also as a signal of the need to integrate structural sanitation assessments with regular air quality monitoring (Amsal et al., 2021; Utomo et al., 2026; Suparni et al., 2025).

Comparing the results of this study with previous research is essential to provide context for the findings. Sanitary inspections at similar tourist attractions across various regions reveal a consistent pattern: while basic sanitation facilities such as public restrooms, clean water supplies, and waste management are generally well-maintained by established operators, aspects like liquid waste management and air quality tend to receive disproportionately less attention (Mulia Sakti, Hi. Amir Sene, & S. Ramadhan, 2024; Taqwin et al., 2023). These findings also align with Maryani et al. (2024), who noted that while tourist attractions in urban East Kalimantan generally meet basic sanitation standards, they continue to face challenges regarding closed drainage systems and indoor air quality.

Regarding the waterways at Samarinda Theme Park, the drainage system was actually well-designed. However, the presence of open drainage channels at certain points indicates a need for management optimization to refine the sanitation system. Suboptimal performance in closed drainage sections is typically attributed to channel capacities being unable to handle stormwater runoff, exacerbated by expanding built-up areas and flat topography, as well as additional loads from domestic wastewater (Thahir et al., 2026; Munir et al., 2022). Consequently, Munir et al. (2022) suggest that technical solutions, such as adjusting channel dimensions and implementing routine maintenance protocols, are viable strategies for addressing similar drainage issues. Furthermore, the availability of clean water and waste management that meet health standards is not merely a matter of aesthetics, but a fundamental necessity to ensure visitors feel safe, comfortable, and protected from the risk of disease while at the tourist site (Munthe et al., 2024; Fitri et al., 2023).

The public health implications of this study are closely linked to potential health risks for visitors and staff regularly exposed to the environmental conditions at Samarinda Theme Park. Outdoor humidity levels, averaging 92,2% (well above the comfort and quality standard range of 40–70%) pose a risk of increased skin ailments and respiratory infections, while also potentially exacerbating health issues for vulnerable groups such as children and the elderly (Maryani et al., 2024; Staryo et al., 2024). Consequently, visitors particularly those in vulnerable groups will tend to postpone their visits, shorten the duration of their recreational activities, or even opt for alternative destinations with better environmental quality to safeguard their health (Yansya et al., 2026).

Furthermore, PM10 levels exceeding quality standards at indoor sampling point 2 warrant serious attention, given that enclosed spaces are areas where visitors may experience prolonged exposure. Inhaled PM_{10} particles can irritate the upper respiratory tract; for at-risk populations, such as individuals with asthma or chronic obstructive pulmonary disease (COPD), such exposure has the potential to exacerbate symptoms. These findings align with the broader objectives of the Healthy Living Community Movement (Germas) and the Community-Based Total Sanitation (STBM) program, both of which emphasize the importance of safe and healthy tourism environments as part of national health promotion and disease prevention efforts.

Deficiencies in the wastewater disposal component, specifically regarding enclosed drainage, also carry significant implications. Incompletely covered drainage systems can serve as sources of unpleasant odors, disease vectors, and environmental contamination, thereby directly diminishing the visitor experience and creating long-term environmental health risks. A dirty, poorly maintained tourism environment with inadequate sanitation facilities, such as filthy restrooms or poor waste disposal systems can reduce visitor interest and damage the region's tourism image (Susilawati et al., 2025; Yuantari & Andrean, 2022).

While this study makes a significant contribution by characterizing sanitation conditions and environmental quality at the Samarinda Amusement Park, certain limitations

must be critically acknowledged. First, the study is cross-sectional in nature, representing conditions at a single point in time and failing to capture fluctuations in sanitation and air quality that may vary according to the season, visitor volume, or special events. Second, the limited number of air quality sampling points (two outdoors and two indoors) may not comprehensively represent the overall air quality across the relatively large tourism area. Third, the study did not measure airborne microbiological parameters or clean water quality via laboratory analysis; consequently, assessments relied on visual and procedural evaluations. These limitations may affect the generalizability of the results and should be taken into account when interpreting the findings.

5. Conclusion

This study shows that sanitation conditions at Samarinda Theme Park generally meet environmental health standards established for recreational areas. The sanitation assessment resulted in a score of 95,21%, indicating that Samarinda Theme Park falls into the healthy category. The clean environment, adequate sanitation facilities, and adequate health and safety support reflect optimal environmental management efforts to create a healthy and comfortable recreational area for visitors.

Furthermore, air quality measurements indicate that most parameters remain in good condition and support recreational activities. However, several aspects still require attention, particularly the wastewater disposal system and improving air quality in certain areas with higher PM10 concentrations. Therefore, ongoing maintenance and monitoring efforts are necessary to maintain sanitation quality and environmental health in the recreational area. This study recommends that Samarinda Theme Park management continue to improve environmental sanitation management through routine monitoring of sanitation facilities, waste disposal systems, and air quality. For educational institutions, the results of this study are expected to serve as a reference source for environmental health education. Meanwhile, for future researchers, this research can be used as a basis for developing more in-depth studies on sanitation of recreational areas and factors that influence environmental health in public places.

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