

Quality of Environment Analysis Report at SDN 101820 Pancur Batu & SDN 106172 Desa Tuntungan II

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Abstract

Background: School sanitation plays an important role in creating a healthy, safe, and comfortable learning environment for students. Adequate sanitation facilities can help prevent environmental-related diseases and support students' health and well-being. This study aimed to describe the condition of environmental sanitation facilities at SD Negeri 101820 Pancur Batu and SD Negeri 106172 Desa Tuntungan II, Deli Serdang Regency, North Sumatra, Indonesia.

Method: This study employed a descriptive qualitative design using direct observation and interviews. Data were collected on May 12, 2026, using an observation checklist covering clean water facilities, toilet facilities, handwashing facilities with soap (CTPS), wastewater management, and solid waste management.

Result: The results showed that both schools generally met the standards for clean water facilities in terms of availability, accessibility, and physical quality. However, several deficiencies were identified in other sanitation components. Toilet facilities lacked some required supporting facilities, while CTPS facilities were not evenly available in all locations. Wastewater management was the most critical issue, as both schools did not use septic tanks that met the applicable standards and did not conduct routine desludging. In addition, solid waste management practices were inadequate due to the absence of waste segregation and limited waste disposal facilities.

Conclusion: In conclusion, although clean water facilities met the required standards, improvements are still needed in toilet facilities, CTPS facilities, wastewater management, and solid waste management. Strengthening sanitation infrastructure

and environmental health management is essential to create a healthier and safer school environment.

1. Introduction

School sanitation is a crucial component in creating a healthy, safe, and comfortable educational environment for students. The availability of adequate sanitation facilities not only plays a role in maintaining the health of the school community but also supports optimal teaching and learning processes. A school environment with access to clean water, adequate toilet facilities, handwashing facilities with soap (CTPS), a wastewater treatment system, and proper waste management can reduce the risk of environmental-related diseases such as diarrhea, acute respiratory infections (ARI), skin diseases, and other sanitation-related illnesses.¹

Schools, as places where learning activities take place for the majority of children's time, play a crucial role in fostering clean and healthy living behaviors (PHBS). Therefore, providing sanitation facilities that meet environmental health standards is a requirement that must be met by every educational institution. Good school sanitation is not only related to the physical condition of facilities and infrastructure, but also reflects the school's efforts to create an environment that supports sustainable student health.²

One of the main components of school sanitation is the availability of clean water. Clean water is necessary for various daily activities, such as toilet use, handwashing, environmental cleaning, and personal hygiene. The water used must meet health requirements, namely being colorless, odorless, tasteless, free from harmful substances, and available in sufficient quantities for the entire school community. The availability of adequate clean water is the basis for the provision of other sanitation facilities, so its presence is crucial for the quality of a healthy school environment.³

In addition to clean water, the availability of standard school latrines is also an important indicator in assessing school environmental sanitation. A good latrine should be safely constructed, clean, easy to use, have clean water, adequate ventilation, and be gender-segregated. Separation of latrines for boys and girls is crucial, especially for students entering puberty, as it relates to comfort, privacy, and reproductive health. The presence of covered waste bins in girls' latrines is also crucial in supporting Menstrual Hygiene Management (MHM) in the school environment.⁴

Handwashing with Soap (HWSS) facilities are sanitation facilities that serve as a preventative measure for infectious diseases in the school environment. Providing HWSS facilities equipped with running water and soap in strategic locations can improve handwashing habits among students. Handwashing with soap has been proven effective in reducing the risk of transmission of various infectious diseases, particularly diarrhea and acute respiratory infections (ARI). Therefore, the presence of adequate HWSS facilities is an important indicator of creating a healthy school.⁵

Another equally important component of sanitation is wastewater treatment and waste management. Wastewater treatment that does not meet standards has the potential to pollute soil and groundwater, thus becoming a source of disease transmission. Substandard septic tanks and those that are not regularly desludging can increase the risk of waste leaking into the surrounding environment. Similarly, waste management that does not involve sorting can lead to waste accumulation, odors, breeding grounds for disease vectors, and reducing the quality of the school environment.⁶

2. Materials and Methods

Study Area and Time

This study was conducted at SD Negeri 101820 Pancur Batu and SD Negeri 106172 Desa Tuntungan II, Deli Serdang Regency, North Sumatra, Indonesia. The schools were selected to assess the condition of environmental sanitation facilities and their compliance with school sanitation standards. Data collection was carried out on May 12, 2026.

Research Design

This study employed a descriptive qualitative research design. The study aimed to describe and evaluate the condition of environmental sanitation facilities in elementary schools based on established environmental health standards. No intervention or treatment was applied during the study.

Population and Sample

The population of this study consisted of all environmental sanitation facilities available at SD Negeri 101820 Pancur Batu and SD Negeri 106172 Desa Tuntungan II. The observed sanitation components included clean water facilities, toilet facilities, handwashing facilities with soap (CTPS), wastewater management systems, and solid waste management facilities.

Data Collection

Data were collected through direct observation and interviews. Direct observation was conducted to assess the physical condition and availability of sanitation facilities in both schools using an observation checklist. Interviews were carried out with school representatives to obtain supporting information regarding the operation and maintenance of sanitation facilities.

Research Instrument

The primary instrument used in this study was an environmental sanitation observation checklist developed based on school environmental health standards. The checklist covered five main components: clean water facilities, toilet facilities, handwashing facilities with soap (CTPS), wastewater management systems, and solid waste

management. Documentation in the form of photographs was also collected to support the observation findings.

Data Analysis

The collected data were analyzed using descriptive qualitative methods. Observation and interview results were organized according to each sanitation component and then compared with the applicable environmental health standards for schools. The findings were subsequently presented in tables and narrative descriptions to identify compliance levels and areas requiring improvement.

3. Results

The assessment of environmental sanitation facilities was conducted at SD Negeri 101820 Pancur Batu and SD Negeri 106172 Desa Tuntungan II. The observed components included clean water facilities, toilet facilities, handwashing facilities with soap (CTPS), wastewater management systems, and solid waste management.⁷

Clean Water Facilities

The results showed that both schools generally met the requirements for clean water facilities. Adequate water quantity was available to support daily activities, including drinking, handwashing, and toilet use. The physical quality of water was considered acceptable, as the water appeared clear, odorless, and colorless. Water storage facilities were also available and maintained in both schools.⁸

Table 1. Clean Water Facilities

Observation	SDN 101820	SDN 106172
Availability of 10 liters of water per person per day	eligible	eligible
Water reservoirs are available for toilets	eligible	eligible
Clean, colorless water	eligible	eligible
The water has no smell	eligible	eligible
Water has no taste	eligible	eligible
Water does not contain poison	eligible	eligible
Water is accessible to school residents	eligible	eligible

Toilet Facilities

Observations revealed that toilet facilities in both schools were available and functional. However, several deficiencies were identified. The toilets were not fully separated by gender, and female toilets did not provide covered waste bins for the disposal of sanitary products. These conditions indicated that the toilet facilities had not completely fulfilled the recommended school sanitation standards.⁹

Table 2. Toilet Facilities

Observation	SDN 101820	SDN 106182
Latrine area 2m ²	Eligible	Eligible
Separate toilets according to gender, male and female	Ineligible	Ineligible
The quality of the toilet door can operate well	Eligible	Eligible
Clean toilet room	Ineligible	Eligible
The toilet room has ventilation	Ineligible	Eligible
Clean water is available	Eligible	Eligible
Washbasin available	Eligible	Ineligible
Trash bins are available for women's toilets.	Ineligible	Ineligible
Water container and dipper are available	Eligible	Eligible
Toilet wastewater is treated through a septic tank	Eligible	Eligible

Handwashing Facilities with Soap (CTPS)

Handwashing facilities with soap were available in both schools; however, their distribution and completeness differed. SD Negeri 101820 Pancur Batu had more complete CTPS facilities, including handwashing stations located near classrooms and toilet areas. In contrast, SD Negeri 106172 Desa Tuntungan II had fewer handwashing facilities, limiting students' access to proper hand hygiene practices.¹⁰

Table 3.3 Handwashing Facilities with Soap

Observation	SDN 101820	SDN 106172
1 CTPS unit is available in each class	Eligible	Ineligible
There is 1 CTPS unit in front of the teacher's room	Eligible	Eligible
1 CTPS unit is available in the toilet area	Eligible	Ineligible
Used CTPS water is collected in water catchment areas	Eligible	Eligible

Wastewater Management

Wastewater management was identified as the most critical sanitation issue in both schools. Observations showed that neither school used septic tanks that complied with the applicable standards. In addition, routine septic tank desludging was not conducted. These conditions may increase the risk of environmental contamination and negatively affect school sanitation.¹¹

Table 3.4 Wastewater Management

Observation	SDN 101820	SDN 106172
Septic tank with SNI 03-2398-2002	Ineligible	Ineligible
Routine suction is carried out	Ineligible	Ineligible

Solid Waste Management

The assessment of solid waste management indicated that both schools had not implemented waste segregation practices. Organic and inorganic waste were disposed of in the same containers, and waste bins were not available in every classroom. Furthermore, no specific facilities were provided for managing different categories of waste. As a result, the waste management systems in both schools did not fully comply with environmental sanitation requirements.¹²

Table 3.5 Solid Waste Management

Observation	SDN 101820	SDN 106172
There are rubbish bins in every school classroom	Ineligible	Ineligible
The school has a temporary polling station	Eligible	Eligible
Waste is sorted into organic and inorganic waste	Ineligible	Ineligible
There is a closed trash can in the women's latrine for disposal used sanitary napkins at school	Ineligible	Ineligible
Schools collaborate with agencies or partners related to waste transportation and processing	Eligible	Eligible

Overall, the findings demonstrated that clean water facilities generally met the required standards, whereas toilet facilities, CTPS facilities, wastewater management, and solid waste management still showed several deficiencies requiring improvement.

4. Discussions

Research conducted by Jannah et al. (2025) in the journal AUFKLARUNG: Journal of Education Research & Innovation explains that waste sorting at source is an important part of the implementation of Education for Sustainable Development (ESD) in elementary schools to increase students' awareness of 3R-based waste management (Reduce, Reuse, Recycle). The study found that waste sorting at source is carried out directly at the waste generation site, such as classrooms, the canteen, and the school grounds, before the waste is collected and disposed of in the final disposal site. The main purpose of this sorting is to facilitate the waste management process, reduce environmental pollution, and increase the effectiveness of the recycling system. Furthermore, this study shows that the success of waste sorting is greatly influenced by the involvement of various parties within the school: the principal as the policymaker, teachers as educators and facilitators, students as the primary implementers, and cleaning staff as the technical implementers of waste management. Collaboration between all school components is a crucial factor in the successful implementation of a waste sorting system.

Each type of waste requires different management methods, such as organic waste that can be processed into compost and inorganic waste that can be recycled. However, the

study also revealed obstacles to implementing waste sorting at source, such as low student awareness, undeveloped habits, and limited facilities and infrastructure for separate waste bins. Therefore, this study emphasizes the importance of strengthening environmental education through an ESD approach to foster environmentally conscious behavior from an early age.¹³

Clean Water Facilities

Based on observations conducted at SDN 101820 Pancur Batu and SDN 106172 Tuntungan II Village, all clean water facility indicators met the established requirements. Both schools had a minimum water supply of 10 liters per person per day, a water reservoir for toilets, and the water was colorless, odorless, and tasteless, non-toxic, and easily accessible to all school members. These conditions indicate that the clean water supply at both schools was adequate and capable of supporting daily sanitation activities. The availability of adequate clean water is crucial because it is a key factor in maintaining the cleanliness of the school environment, supporting the use of toilets, implementing handwashing with soap and water (HWWS), and preventing the occurrence of environmentally-related diseases. Clean water that meets health requirements plays a crucial role in creating a healthy and comfortable learning environment. If clean water needs are not met, various sanitation activities such as handwashing, cleaning toilets, and maintaining the cleanliness of the school environment will be disrupted. These conditions can increase the risk of infectious diseases such as diarrhea, typhoid, and skin diseases in students. Therefore, the availability of clean water that meets standards is an important indicator in assessing school sanitation.

Research by Lay, Sahdan, and Doke (2024) found that clean water facilities in the elementary schools studied met most environmental health requirements. This research indicates that the availability of sufficient and easily accessible water sources can support clean and healthy lifestyles in students.⁶ Based on research by Abdillah & Asih (2022) on Environmental Health Sanitation Facilities in Elementary Schools in Kucur Village, Malang Regency, clean water facilities in most elementary schools in Kucur Village meet school sanitation standards as outlined in the 2018 School Sanitation Development Guidelines. Observations and interviews indicate that these schools have adequate access to clean water to meet the needs of school residents for daily activities, such as using latrines, washing hands with soap (CTPS), and maintaining a clean school environment. Clean water is sufficiently available and easily accessible to both students and teachers, supporting the implementation of clean and healthy living behaviors (PHBS) in the school environment. However, this study also found that some sanitation facilities still do not fully meet standards, requiring regular evaluation and improvement to maintain the quality of school sanitation.²

However, the results of this study differ from those of Yani (2023), who found that the clean water facilities at SDN 101957 Desa Besar 2 Terjun Serdang Bedagai still did not meet all environmental health requirements due to limited water supply facilities. This difference indicates that the condition of clean water supply at each school can vary

depending on the availability of water sources, facility management, and school support in maintaining the continuity of clean water supply. Therefore, the condition of the clean water facilities at SDN 101820 and SDN 106172 can be categorized as good and have supported the creation of a healthy school environment.¹⁴

Toilet Facilities

Based on observations, toilet facilities at both schools still do not fully meet school sanitation standards. Although the toilets are large enough, the toilet doors function properly, clean water is available, water containers, dippers, and wastewater is channeled to a septic tank, several inconsistencies were still identified. Both schools do not have separate toilets for boys and girls. Furthermore, there are no dedicated waste bins for girls' toilets.

At SDN 101820, toilet hygiene conditions were found to be poor and there was a lack of adequate ventilation. Toilets that meet health standards are crucial for maintaining student comfort and health while at school. The lack of gender-segregated toilets can reduce student comfort, especially for female students entering puberty. Furthermore, the lack of dedicated sanitary napkin waste bins can lead to hygiene issues and hinder the implementation of Menstrual Hygiene Management (MHM) in the school environment.

Research by Fatria (2023) found that toilet facilities are one component of school sanitation that still experience significant deficiencies. The study showed that some schools still have unsanitary toilets, inadequate ventilation, and incomplete supporting facilities.⁴ Yani's (2023) research also found that toilet facilities in the elementary schools studied did not meet all environmental health requirements, particularly in terms of gender segregation.¹⁴ Nadirahilah et al.'s (2023) research on Menstrual Hygiene Management (MHM) in schools also explains that the availability of covered waste bins in girls' restrooms is an important component in maintaining the reproductive health of adolescent girls. Therefore, the absence of these facilities in both schools indicates that the sanitation aspects that support MHM still need to be improved.¹⁵ Based on comparisons with other studies, the condition of toilet facilities at SDN 101820 and SDN 106172 still require various improvements, especially in terms of comfort, privacy, cleanliness, ventilation, and the provision of supporting facilities for female students.¹⁵

Handwashing with Soap (HWWS) Facilities

Based on observations, the HWWS facilities at SDN 101820 are better than those at SDN 106172. SDN 101820 has provided one HWWS unit in each classroom, one unit in front of the teachers' lounge, and one unit in the toilet area. Meanwhile, SDN 106172 does not have HWWS facilities in each classroom or in the toilet area. However, both schools have a system for disposing of used HWWS water into water catchment areas.

HWWS facilities play a crucial role in breaking the chain of transmission of infectious diseases in the school environment. Handwashing with soap can reduce the risk of

diarrhea, acute respiratory infections (ARI), and various other environmental diseases. Therefore, the availability of adequate HWWS facilities should be a priority in school sanitation management.

Research by Utomo, Sukmawati, and Masagala (2023) showed that the handwashing with soap (HWWS) facilities at Kalidadap Public Elementary School initially did not meet school sanitation standards. The number of HWWS facilities available was limited and not evenly distributed throughout the school. Furthermore, some existing facilities were not equipped with soap and had inadequate drainage systems.

To address these issues, HWWS facilities were provided at several strategic locations, such as the school entrance, in front of classrooms, and in the student restroom area. The results showed that the addition of HWWS facilities increased school community access to adequate handwashing facilities and supported the implementation of Clean and Healthy Living Behaviors (PHBS).

With the availability of more adequate HWWS facilities, handwashing with soap became easier, helping to prevent the spread of disease in the school environment (Utomo et al., 2023). Compared to the research results, SDN 101820 is relatively well-off, as it provides handwashing sanitation (HWHS) facilities at various strategic locations. However, SDN 106172 still needs additional handwashing sanitation (HWHS) facilities to ensure all students have easy access to these facilities. The uneven availability of handwashing sanitation (HWHS) can be a barrier to implementing healthy and clean hand hygiene (PHBS) within the school environment. Therefore, handwashing sanitation (HWHS) facilities at both schools still need to be improved, particularly at SDN 106172, to ensure all students have equal access to adequate hand hygiene facilities.¹⁶

Liquid Waste Management

Based on direct field observations at SDN 101820 Pancur Batu and SDN 106172 Desa Tuntungan II, the liquid domestic waste treatment component was identified as the most critical issue. Referring to Table 4, both schools assessed during this field visit DO NOT MEET environmental health requirements, as they were found not to use septic tank constructions that comply with the technical parameters of the Indonesian National Standard (SNI 03-2398-2002). This structural nonconformity is exacerbated by the fact that neither school carries out maintenance in the form of periodic septic tank desludging; as a result, the effective storage capacity is at risk of overflow and contamination of the surrounding soil layers.

When compared with the findings of Asnita Yani (2023) on the condition of sanitation facilities at SDN 101957 Desa Besar 2 Terjun, Pantai Labu District, Deli Serdang Regency, North Sumatra Province, it was found that liquid waste treatment at that school also DID NOT MEET requirements. In her study, which evaluated sanitation facilities according to technical quality standards including the criterion of septic tank watertightness, Asnita Yani (2023) reported that the wastewater disposal facilities

(SPAL) and toilet systems at SDN 101957 were still significantly inadequate and failed to meet environmental health requirements due to limited infrastructure.¹⁴

This comparison indicates that both the schools visited (SDN 101820 and SDN 106172) and the comparison school (SDN 101957) fall into the category of NOT MEETING requirements with respect to domestic liquid waste treatment. The failure to provide SNI 03-2398-2002–standardized watertight septic tanks and the absence of routine desludging are fundamental problems affecting these primary schools, which, if left unaddressed, could lead to the release of pathogenic bacteria such as *Escherichia coli* into the school environment.

Solid Waste Management

Field observations of daily solid waste management at SDN 101820 Pancur Batu and SDN 106172 Desa Tuntungan II indicate that both schools DO NOT MEET the required standards. According to Table 5, the two schools visited during this field assessment do not separate organic and inorganic waste, do not provide separate waste bins in each classroom, and lack closed waste bins in the female restrooms for disposal of used sanitary pads. This situation contrasts sharply with findings reported by Pangestu et al. (2024) in their study of the Adiwiyata Program implementation at SDN Rejosari 02, Rejosari Subdistrict, East Semarang District, Semarang City, Central Java Province. That study found that SDN Rejosari 02 MEETS the requirements for solid waste management. The school provided separated waste bins (organic, inorganic, and paper) in front of every classroom, implemented source-level periodic waste separation, maintained an adequate Temporary Storage Area (TPS), and converted organic waste into compost through active student participation.

The comparison shows that schools that facilitate basic separation infrastructure, such as SDN Rejosari 02, are able to create a hygienic environment. Conversely, SDN 101820 and SDN 106172 fall into the NOT MEETING category because the absence of basic segregation infrastructure causes mixed solid waste accumulation that is unsanitary in the learning environment. Technical Quality Standards for Solid Waste Management require schools to implement proper waste segregation by providing separate, clearly color-coded waste bins throughout the school environment. Green bins should be used for organic waste, yellow bins for inorganic waste, and red bins for hazardous (B3) waste. These bins must be available in every classroom, the cafeteria, and other areas of the school. In addition, to support privacy, hygiene, and effective Menstrual Hygiene Management (MHM), each girls' toilet cubicle must be equipped with a covered waste bin for the safe disposal of used sanitary pads. Schools are also required to maintain a Temporary Storage Area (TPS) that is protected from disease vectors such as flies and rodents. Furthermore, regular waste collection arrangements should be established and maintained in collaboration with the local sanitation authority to ensure proper waste management and environmental cleanliness.²¹

5. Conclusions

The findings revealed that the sanitation conditions of SDN 101820 Pancur Batu and SDN 106172 Desa Tuntungan II were not yet fully compliant with school sanitation standards. Although clean water facilities generally met the required criteria and handwashing facilities were available, several shortcomings were identified in toilet facilities, domestic wastewater treatment, and solid waste management. The absence of proper waste segregation, inadequate menstrual hygiene facilities, and non-standard septic tank systems indicate the need for further improvements. Strengthening sanitation infrastructure and routine maintenance is essential to support a cleaner, healthier, and safer school environment for students.

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