OPEN ACCESS

Int. J. Educ. Found. 03 (02) 2026. 259-268 DOI: 10.33687/ijef.003.02.0106

Check for updates

IJEF

Available Online at EScience Press
International Journal of Education Foundations
ISSN: 3078-7866 (Online), 3078-7858 (Print)
https://ijef.esciencepress.net

RESEARCH ARTICLE

# Relationship between Improved School Water, Sanitation, and Hygiene (SWASH) Facilities and Pupils' Learning Quality in Public Primary Schools in Meatu District, Simiyu-Tanzania

**[a]Masigati P. Mayau, [b]Prospery M Mwila, [b]Daniel Oduor Onyango**

*[a] Itongolyangamba Primary School.*

*[b]Department of Education Foundations, St. Augustine University of Tanzania.*

**Corresponding Author**

*Masigati P. Mayau, Email: mayaumasigati@gmail.com*

***Author's Contributions***

*All authors contributed equally to this research.*

***Article History***

*Received: November 22, 2025; Accepted: January 28, 2026; Published: March 14, 2026.*

## ABSTRACT

This paper examined the relationship between improved school water, sanitation, and hygiene (SWASH) facilities and pupils' learning quality in public primary schools in Meatu district, Simiyu region, Tanzania. The study was guided ecological systems theory which was developed by Urie Bronfenbrenner in 1979. The study adopted a quantitative approach using a descriptive survey design. From a target population of 80,999, a sample of 230 respondents was selected which included 97 teachers and 133 pupils were selected through stratified and simple random sampling. The sample size for teachers and pupils was determined using Yamane's formula (1967). The proportional distribution of participants per school was determined using Bowley's formula, resulting in detailed sample sizes for teachers and pupils across 13 schools. Data collection instruments included questionnaires and structured observations, with reliability coefficients of 0.7 for pupils' and 0.9 for teachers' questionnaires. Data were analyzed using with descriptive statistics, frequency and tables with the help of SPSS version 26. The results revealed that improved SWASH facilities showed a strong positive correlation with quality learning ($r = .643$, $p < .01$) and a moderate correlation with pupils' attendance and learning experiences ($r = .248$, $p = .004$). This indicates that better water, sanitation, and hygiene significantly enhance both attendance and academic outcomes in primary schools. The study concluded that improved SWASH facilities are essential for supporting consistent pupil attendance and quality learning in public primary schools. The study recommended that schools provide clean, well-maintained, and gender-sensitive sanitation facilities, along with safe drinking water and hygiene education. It also urged stronger collaboration with communities and stakeholders to ensure sustained improvements and broader educational support.

**Keywords:** Improved SWASH facilities; school water; sanitation and hygiene; pupils' learning quality; public primary schools

## INTRODUCTION

School Water, Sanitation, and Hygiene (SWASH) programs are vital for enhancing children's health, well-being, and academic performance by providing access to clean water, sanitation facilities, and hygiene practices like handwashing. These interventions help prevent waterborne diseases, reduce absenteeism, and create safe, inclusive school environments that support consistent attendance and learning (Sharma et al., 2024). Gender-responsive facilities, especially private toilets for girls, promote equity and a positive school climate (Pasewaldt et al., 2019). When combined with

quality teaching and supportive services, SWASH fosters healthy habits and a positive educational experience (Papanthymou & Darra, 2023; Grimus, 2020). Hygiene education further strengthens these outcomes by encouraging lasting behavior change and reducing illness-related absences (McMichael, 2019; Dibaba et al., 2024). These benefits extend into homes and communities, improving broader public health. Given the strong link between poor sanitation and low academic achievement in infrastructure-limited areas (Jacob & Alex, 2024), and the persistent challenges in many developing regions (Antwi-Agyei et al., 2017; European Commission, 2020), investing in SWASH is essential not only as a health measure but as a foundational strategy for equitable and quality education in public primary schools.

Sweden has demonstrated a strong commitment to advancing Water, Sanitation, and Hygiene (WASH) in schools, particularly in low-income regions, as part of its efforts to support the Sustainable Development Goals. Through the Swedish International Development Cooperation Agency (SIDA), Sweden backs gender-responsive and climate-resilient WASH initiatives, with a focus on menstrual hygiene management to support girls' education and well-being. Climate change has added pressure on already vulnerable regions by exacerbating WASH-related challenges, particularly where inadequate facilities affect children's health and school attendance. Similarly, the Philippines has prioritized WASH in schools through policies like DepEd Order No. 65 and the WinS program, aiming to reduce illness and improve educational outcomes. However, inconsistent staff training and lack of accountability have hindered effective implementation, highlighting the need for stronger capacity-building and continuous improvement efforts.

In African countries, WASH programs in schools rely heavily on partnerships between governments, NGOs, and communities. In Kenya, Uganda, and Ghana, collaborative initiatives like WASH4Health and UWASH have made strides in improving infrastructure and promoting hygiene behaviors among students and teachers. Nevertheless, persistent challenges such as poor sanitation facilities, lack of menstrual hygiene management, and inadequate handwashing stations especially in rural areas, continue to affect girls' education and student health. The COVID-19 pandemic further underscored the essential role of SWASH (School WASH) in maintaining hygiene and protecting learning outcomes. Despite national efforts, WASH-related diseases still contribute to high absenteeism, reducing teacher-pupil contact time and undermining overall educational progress.

In Tanzania, improved School Water, Sanitation, and Hygiene (SWASH) facilities have been increasingly recognized as vital for enhancing pupils' health, attendance, and overall learning quality. National programs such as the Water Sector Development Programme (WSDP) and the National Sanitation Campaign have sought to address infrastructure deficits and promote hygiene behavior change, particularly in rural and underserved areas (Ministry of Water, 2022; Mwesongo & Mwakipesile, 2023). Despite some progress, many schools still face inadequate WASH services, which negatively affect students' focus and academic performance. The introduction of Fee-Free Basic Education in 2015 led to increased enrollment, overwhelming existing facilities and revealing significant gaps in basic hygiene services, access to safe drinking water, and menstrual health management (MoEST, 2022). These deficiencies hinder the creation of a healthy, supportive learning environment crucial for improving educational outcomes and promoting gender equity.

In Meatu District, these WASH challenges are especially acute, making it a critical area for evaluating the relationship between improved SWASH facilities and pupils' learning quality. Schools in Meatu experience limited access to clean water, poor sanitation facilities, and inadequate hygiene practices, which contribute to frequent waterborne diseases and high rates of absenteeism (MoEST, 2022; Daily News, 2024). The SWASH project targets these issues by improving water and sanitation infrastructure, promoting hygiene education, and supporting vulnerable groups, including girls with menstrual hygiene management. Therefore, this study examined the relationship between improved SWASH facilities and pupils' learning quality in public primary schools in Meatu district.

## LITERATURE REVIEW

### Theoretical Review

The Ecological Systems Theory, developed by Urie Bronfenbrenner in 1979, assumes that human development is shaped by multiple, interconnected environmental systems ranging from immediate settings like family and school (microsystem) to broader societal and cultural influences (macrosystem). It also emphasizes the dynamic, bidirectional interactions

between individuals and these environments, as well as how these contexts evolve over time (chronosystem). This theory is highly relevant to understanding the impact of improved SWASH facilities on pupils' learning quality in public primary schools because it highlights how enhanced sanitation and hygiene directly improve pupils' health and attendance within the school environment, which boosts concentration and academic performance. Furthermore, the theory underscores the importance of the mesosystem, where school-based hygiene education influences household practices, reinforcing healthy behaviors that support learning. Community involvement and supportive local and national policies form part of the exosystem and macrosystem layers, which are essential for sustaining SWASH initiatives and creating a conducive environment for long-term educational benefits. Thus, Bronfenbrenner's framework provides a comprehensive lens for understanding how multi-layered environmental improvements through SWASH programs contribute to better educational outcomes and overall pupil well-being.

**Literature Review**

In India, Gupta and Anand (2023) investigated the efficacy and accessibility of WASH (water, sanitation, and hygiene) facilities in rural primary schools. A self-administered questionnaire and a modified Joint Monitoring Program (JMP) observation checklist were used to gather data from 28 schools. The findings demonstrated that WASH facilities were present in every school, but the infrastructure's usability and sufficiency were lacking. Additionally, the study discovered that pupils' hand hygiene knowledge, attitudes, and practices (KAP) ratings were higher in schools with handwashing stations near restrooms ($p = 0.018$). The study comes to the conclusion that although recent national initiatives in India have improved access to WASH facilities, more work must be done to improve the facilities' sufficiency, upkeep, and use. It also suggests using community, parent, and teacher-led health promotion initiatives to enhance schoolchildren's sanitation and hygiene practices. A critique of the study could highlight the small sample size and suggest that broader, multi-region studies would provide more comprehensive insights. Therefore, this study included a large sample size to explore the long-term impact of improved WASH infrastructure on pupil health outcomes and behavior.

In the Sunyani East Education Directorate in Ghana, Duah (2024) sought to evaluate how well WASH practices were being implemented in basic schools. Questionnaires and interviews were among the qualitative and quantitative techniques used to gather data. Basic WASH amenities, including urinals, toilets, handwashing supplies, and solid waste disposal, were found in the schools under investigation. The Methodist School had concrete slab latrines, while all the other schools utilized wooden slab pit latrines. Pupils had to gather water from nearby homes, and there were serious shortcomings such as the lack of toilet paper, taps, and hand soap. In order to improve the sanitation and hygiene conditions in basic schools in the Sunyani East region, the study suggests that important stakeholders, including the Ghana Education Service, the District Education Directorate, the School Management Committee, and the Parent-Teacher Association, work together to provide necessary WASH facilities. While the study sheds light on important WASH gaps, it could be further strengthened by a deeper analysis of the barriers preventing the government from addressing these issues and the feasibility of the proposed interventions.

Similar research was conducted in the Tanzania by Ngimbwa et al. (2020) on the assessment of the national strategic implementation plan for school water, sanitation, and hygiene (2012-2017) Ukerewe district. 40 schools in the district are government-owned, and 42 schools in total participated in a cross-sectional poll. Prior to fieldwork, a structured interview that had been pre-tested and modified was utilized to gather data, and systematic random sampling was employed. According to the study's findings, there are only 31.3% of latrines in acceptable condition, and over half of schools lack handwashing stations. The latrine-hole to pupil ratio was 1:71. Of the schools having hand washing stations, only 21.4% have a good hand cleaning routine (using soap and water). Among those with water storage facilities, lake water was the most frequently used source (35.7%). With few and badly maintained restrooms, insufficient handwashing stations, and reliance on potentially hazardous water sources, the study's findings thus point to serious deficiencies in the sanitation and hygiene infrastructure in schools, highlighting the urgent need for extensive upgrades in school WASH services.

**METHODOLOGY**

This study employed a quantitative research approach with a descriptive survey design to assess the impact of the SWASH program in Meatu District, Tanzania. The

targeted population consisted of 80,999 individuals, including 79,944 pupils and 1,055 teachers. Using the Yamane formula (1967) and recommendations from Mugenda & Mugenda (2003), a sample size of 230 participants was selected: 133 pupils and 97 teachers. Thirteen schools were chosen as the sample frame, representing approximately 10% of the schools in the district. Stratified sampling based on gender was applied to both teachers and pupils, followed by simple random sampling to ensure fair representation and reduce bias. The proportional distribution of participants per school was determined using Bowley's formula, resulting in detailed sample sizes for teachers and pupils across the 13 schools. Data were collected using questionnaires and observation checklists, with instruments validated by experts and tested for reliability through a pilot study that showed Cronbach's Alpha scores of 0.923 for teachers and 0.731 for pupils, indicating high and acceptable internal consistency, respectively. Data analysis was performed using SPSS version 26 with descriptive statistics to identify trends and patterns. Ethical protocols including informed consent, confidentiality, voluntary participation, and harm reduction were strictly followed throughout the study.

## PRESENTATION OF THE FINDINGS

### The Relationship Between Improved SWASH Facilities and Pupils' Learning Quality

This is the third objective, which is intended to assess the relationship between improved SWASH facilities and pupils' learning quality in public primary schools. The researcher collected data from both pupils and teachers. The data focused on how access to safe water, sanitation, and hygiene affected classroom attendance, concentration, and overall academic performance. The findings aimed to determine whether improvements in SWASH facilities contribute to a more conducive learning environment for pupils. Table 1 presents the findings.

Table 1. Teachers' response on the relationship between improved SWASH facilities and pupils' learning quality (n=84)

| No. | Items | SD | | D | | N | | A | | SA | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | % | F | % | F | % | F | % | F | % |
| 1. | Proper sanitation facilities contribute to higher pupil attendance rates. | 2 | 2.4 | 1 | 1.2 | 4 | 4.8 | 61 | 72.6 | 16 | 19 |
| 2. | Improved SWASH facilities make the school environment more comfortable and promote regular attendance. | 2 | 2.4 | 1 | 1.2 | 2 | 2.4 | 60 | 71.4 | 19 | 22.6 |
| 3. | Pupils who feel that sanitation at school is good are more motivated to attend classes. | 2 | 2.4 | 1 | 1.2 | 6 | 7.1 | 60 | 71.4 | 15 | 17.9 |
| 4. | The presence of clean and functional toilets encourages pupils to stay at school. | 3 | 3.6 | 2 | 2.4 | 15 | 17.9 | 53 | 63.1 | 11 | 13.1 |
| 5. | Poor sanitation and hygiene facilities are not a reason for students to skip school. | 32 | 38.1 | 25 | 29.8 | 12 | 14.3 | 10 | 11.9 | 5 | 6 |
| 6. | The availability of SWASH facilities is just one of many factors affecting pupils' attendance. | 15 | 17.9 | 34 | 40.5 | 7 | 8.3 | 23 | 27.4 | 5 | 6 |

Source: Field Data (2025)

### Proper Sanitation Facilities Contribute to Higher Pupil Attendance

Out of 84 respondents, the majority 61 (72.6%) agreed and 16 (19%) strongly agreed that proper sanitation facilities at school lead to better pupil attendance, while only 2 (2.4%) strongly disagreed, 1 (1.2%) disagreed, and 4 (4.8%) were neutral. These results highlight a strong perception that clean, accessible sanitation facilities are essential in supporting regular school attendance. When hygiene areas and toilets are well-maintained, pupils especially girls feel more

comfortable and secure, reducing the likelihood of absenteeism due to embarrassment, health concerns, or lack of privacy. This supports the view that SWASH improvements are not peripheral amenities but central to student retention and engagement. Gupta and Anand (2023) found that although WASH infrastructure was present in all surveyed schools, its usability and adequacy were often lacking. Similarly, Sharma et al. (2024) identified the absence of separate toilets for girls, menstrual hygiene facilities, and essential sanitation supplies as major contributors to absenteeism among female pupils. These patterns align with Bronfenbrenner's Ecological Systems Theory, which underscores how a child's immediate physical environment (microsystem), such as school sanitation infrastructure, directly influences behavior, well-being, and learning outcomes. Therefore, improving sanitation facilities should be viewed not just as a health initiative but as a core strategy for boosting attendance, promoting equity, and enhancing the educational experience for all learners.

**Improved Facilities Create a Comfortable Learning Environment**

Survey results show that the majority of respondents 60 (71.4%) agreeing and 19 (22.6%) strongly agreeing believe that improved SWASH (School Water, Sanitation, and Hygiene) facilities such as toilets and handwashing stations promote a comfortable school environment and encourage regular attendance, while only 2 (2.4%) strongly disagreed, 1 (1.2%) disagreed, and 2 (2.4%) were neutral. These findings highlight the critical role of hygienic infrastructure in fostering an inclusive, supportive, and safe learning space. A clean environment reduces anxiety, especially for younger pupils and adolescent girls, who may otherwise avoid school due to discomfort or lack of privacy. Confidence in available sanitation facilities encourages regular attendance and active engagement in class. This is supported by Ahmed et al. (2023), who emphasized the need for resilient and well-maintained WASH infrastructure in disaster-affected schools, and by Duah (2024), who identified significant deficits in Sunyani East basic schools, including lack of soap, toilet paper, and functioning water sources. Bronfenbrenner's Ecological Systems Theory reinforces these findings by asserting that a child's immediate environment, such as school facilities, directly influences behavior and outcomes. Therefore, SWASH improvements serve not just physical needs but also act as behavioral enablers that build trust, enhance safety, and support consistent school participation.

**Pupils Feel More Motivated to Attend When Sanitation is Good**

Only 2 respondents (2.4%) strongly disagreed, 1 (1.2%) disagreed, and 6 (7.1%) were neutral. A majority 60 respondents (71.4%) agreed, while 15 (17.9%) strongly agreed that good sanitation boosts pupils' motivation to attend classes. This result shows that sanitation isn't just about physical comfort, it also affects emotional well-being and motivation. When pupils know their needs will be met at school, they are more willing to attend and participate. This is especially important for girls during menstruation, who may skip school if conditions are poor. Schools should prioritize proper sanitation as part of pupil welfare and motivation strategies. This aligns with Bick et al. (2024), whose study underscored the importance of implementing comprehensive school WASH programs. While improving water and hygiene infrastructure can reduce illness-related absences, Bick et al. argue that additional measures such as education, menstrual hygiene support, and behavioral reinforcement are necessary to fully realize gains in health, attendance, and academic outcomes. These insights support the notion that sanitation is not an isolated service, but part of a broader system that influences motivation and learning.

**Clean Toilets Encourage Pupils to Stay the Whole Day**

The results show that the majority of respondents 53 (63.1%) agreed and 11 (13.1%) strongly agreed that clean, working toilets help pupils stay at school for the entire day, while only 3 (3.6%) strongly disagreed, 2 (2.4%) disagreed, and 15 (17.9%) were neutral. These findings indicate that functional toilet facilities play a crucial role in preventing early departures or class skipping, thereby supporting continuous learning and maximizing time on task. When students lack access to clean, usable toilets, they are more likely to leave school during the day, miss important lessons, or disengage entirely. Ongoing maintenance and monitoring of sanitation facilities should therefore be integrated into school management practices. Supporting this, Melaku et al. (2023) reported that only 31.6% of schools had adequate sanitation, with troubling pupil-to-toilet ratios 1:59 overall, and even greater disparities for female students, who faced a handwashing point-to-pupil ratio of 1:179 compared to 1:114 for males. These inequalities contribute to discomfort, absenteeism, and reduced classroom

engagement. Jacob and Alex (2024) further argued that comprehensive WASH programs are vital for creating safe, inclusive school environments. From a theoretical lens, Bronfenbrenner's Ecological Systems Theory reinforces that the school's physical environment a key part of the microsystem—directly shapes student behavior, comfort, and academic outcomes. Thus, access to clean, functional toilets is not just a health or infrastructure issue, but a foundational requirement for learning continuity, gender equity, and student well-being.

**Poor Sanitation is Not a Reason for Skipping School**

The data reveals that a significant majority of respondents reject the notion that poor sanitation is not a reason for students to skip school. Out of the total, 22 respondents (38.1%) strongly disagreed, 25 (29.8%) disagreed, and 12 (14.3%) were neutral, while only 10 (11.9%) agreed and 5 (6%) strongly agreed with the statement. This strong disagreement indicates that most respondents believe poor sanitation is indeed a valid and influential factor in pupil absenteeism. These perceptions reinforce earlier findings linking inadequate sanitation to missed school days, particularly for girls and pupils with disabilities who may face greater discomfort or stigma. The evidence aligns with Zadock et al. (2024), who identified school latrine cleanliness as the only WASH-related factor significantly associated with reduced absenteeism. Ngimbwa et al. (2020) further reported that just 31.3% of latrines in schools met acceptable standards, over half of schools lacked handwashing stations, and the average latrine-to-pupil ratio stood at a concerning 1:71. Additionally, only 21.4% of schools with handwashing facilities had routines involving soap and water, and 35.7% of schools relied on potentially unsafe lake water. These findings underline that poor sanitation is not a minor issue but a serious barrier to learning. Framed within Bronfenbrenner's Ecological Systems Theory, sanitation facilities form part of the student's microsystem elements of their immediate environment that directly shape behavior and educational engagement. When this aspect of the microsystem is neglected, it disrupts the child's well-being and learning process, making it imperative for schools and policymakers to treat sanitation as a foundational need within the educational ecosystem.

**SWASH is Only One of Many Factors Affecting Attendance**

The findings reveal that while 23 respondents (27.4%) agreed and 5 (6%) strongly agreed that SWASH is just one of many factors influencing pupil attendance, a larger portion 15 (17.9%) strongly disagreed and 34 (40.5%) disagreed, with 7 (8.3%) remaining neutral suggests a divergence in views. This indicates that although many participants recognize the vital role of SWASH in promoting attendance, others believe that broader issues such as poverty, long travel distances, and domestic responsibilities also significantly affect school participation. These insights underscore the need for a holistic approach to attendance improvement, where SWASH serves as a key pillar within a wider framework of educational support. Bick et al. (2024) support this view, noting that SWASH interventions are most impactful when paired with educational and behavioral strategies. Likewise, Ahmed et al. (2023) emphasized that disaster-affected schools often face compounding infrastructural and socio-economic barriers, while Melaku et al. (2023) highlighted that even where WASH facilities exist, high pupil-to-facility ratios and cultural constraints particularly affecting girls limit their effectiveness. These findings align with Bronfenbrenner's Ecological Systems Theory, which posits that children's educational experiences are shaped by interconnected systems, including family, school, and community environments. Therefore, to maximize SWASH's impact on attendance and learning, it should be integrated into comprehensive school programs that address food insecurity, menstrual hygiene, transportation, and community engagement.

Nonetheless, pupils were given likert scale statements concerning the relationship between improved SWASH facilities and pupils' learning quality. The results are presented in table 2.

The findings from the survey demonstrate a strong consensus that access to clean water significantly influences school attendance. Out of 133 respondents, 9 (6.8%) strongly disagreed, 7 (5.3%) disagreed, and 6 (4.5%) were neutral on the statement that clean water encourages regular attendance, while 19 (14.3%) agreed and a majority of 92 (69.2%) strongly agreed. These results suggest that students perceive clean water as crucial for staying hydrated, maintaining hygiene, and feeling comfortable at school. This is consistent with Melaku et al. (2023), who found that the average water facility-to-pupil ratio was 1:48, indicating limited access and significant gender disparities. Ahmed et al. (2023) further stressed the importance of resilient WASH infrastructure, especially in disaster-

affected areas, where lack of water leads to absenteeism. Bronfenbrenner's Ecological Systems Theory supports these findings by emphasizing how immediate environmental factors, such as water availability in schools (microsystem), affect a child's development and school engagement.

Table 2. Pupils' response on the relationship between improved SWASH facilities and pupils' learning quality (n=133)

| No. | Items | SD | | D | | N | | A | | SA | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | % | F | % | F | % | F | % | F | % |
| 1. | Access to clean water at school encourages pupils to attend school regularly. | 9 | 6.8 | 7 | 5.3 | 6 | 4.5 | 19 | 14.3 | 92 | 69.2 |
| 2. | Improved sanitation facilities at school contribute to increased student attendance rates. | 3 | 3.3 | 6 | 4.5 | 9 | 6.8 | 43 | 32.3 | 72 | 54.1 |
| 3. | Improved sanitation facilities such as functioning toilets keep students longer. | - | - | 3 | 2.3 | 14 | 10.5 | 35 | 26.3 | 81 | 60.9 |
| 4. | Access to clean toilets at school helps reduce the number of pupils missing school due to sanitation-related diseases. | 25 | 18.8 | 10 | 7.5 | 13 | 9.8 | 36 | 27.1 | 49 | 36.8 |
| 5. | Improved SWASH facilities make the school environment more pleasant and attractive, thereby increasing attendance. | 2 | 1.5 | - | - | 1 | 0.8 | 12 | 9 | 118 | 88.7 |

(Key: SD-strongly disagree, D-disagree, N-neutral, A-agree, SA-strongly agree)
Source: Field Data (2025)

Regarding sanitation, the data indicates broad recognition of its impact on attendance. For improved sanitation facilities, 3 respondents (3.3%) strongly disagreed, 6 (4.5%) disagreed, and 9 (6.8%) were neutral; 43 (32.3%) agreed and 72 (54.1%) strongly agreed that sanitation improves attendance. On the issue of functioning toilets, no respondents strongly disagreed, only 3 (2.3%) disagreed, 14 (10.5%) were neutral, 35 (26.3%) agreed, and 81 (60.9%) strongly agreed that they help students stay in school longer. Clean and functioning toilets reduce discomfort, prevent early departures, and promote full-day attendance. Melaku et al. (2023) reported only 31.6% sanitation coverage in schools, while Zadock et al. (2024) emphasized that latrine cleanliness was the only school-based WASH factor significantly linked to lower absenteeism. Sharma et al. (2024) also found that poor sanitation, lack of menstrual hygiene management (MHM) resources, and absence of gender-segregated toilets disproportionately affect girls' attendance, reinforcing the need for inclusive sanitation facilities. Ngimbwa et al. (2020) revealed that only 31.3% of school latrines were in acceptable condition, with a latrine-to-pupil ratio of 1:71 and limited access to clean handwashing facilities highlighting systemic issues in sanitation infrastructure.

The influence of sanitation on health-related absenteeism and school attractiveness was also significant. When asked whether clean toilets prevent absenteeism due to sanitation-related diseases, 25 (18.8%) strongly disagreed, 10 (7.5%) disagreed, 13 (9.8%) were neutral, 36 (27.1%) agreed, and 49 (36.8%) strongly agreed indicating mixed experiences but overall support for the link between sanitation and health. This aligns with Sharma et al. (2024), who emphasized the role of WASH deficits in increasing illness and absenteeism, especially among vulnerable groups. On the appeal of SWASH (School Water, Sanitation, and Hygiene) facilities, only 2 (1.5%) strongly disagreed, none disagreed, and 1 (0.8%) was neutral, while 12 (9%) agreed and an overwhelming 118 (88.7%) strongly agreed that such facilities make schools more attractive. This underscores the motivational role of a clean and pleasant school environment. Gupta and Anand (2023) found that although WASH access in India has improved, issues of facility maintenance and community engagement remain. According to Bronfenbrenner's Ecological Systems Theory, enhancing the school environment through functional, well-maintained SWASH facilities positively affects student well-being and participation,

making sanitation investments vital for educational equity and engagement.

**Correlation Analysis**

Correlation is a statistical measure that quantifies the extent to which two variables are linearly related. It indicates both the direction and strength of their relationship. For example, a positive correlation means that as one variable increases, the other tends to increase as well, while a negative correlation suggests they move in opposite directions (Senthilnathan, 2019). Correlation coefficients are interpreted based on their absolute values: a coefficient between 0.00 and 0.29 indicates a small or weak correlation. Values from 0.30 to 0.49 represent a moderate correlation, while coefficients of 0.50 and above signify a high or strong correlation. Negative values follow the same ranges but indicate an inverse relationship between variables (Schober et al., 2018). Table 3 and 4 show the correlation analysis from teachers and pupils.

Table 3. Correlations analysis from teachers' questionnaire (n=84)

| | | Improved SWASH Facilities | Quality Learning |
|---|---|---|---|
| Improved SWASH Facilities | Pearson Correlation | 1 | .643** |
| | Sig. (2-tailed) | | .000 |
| | N | 84 | 84 |
| Quality Learning | Pearson Correlation | .643** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 84 | 84 |

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data (2025)

Table 4. Correlations analysis from teachers' questionnaire (n=133)

| | | Improved SWASH Facilities | Quality Learning |
|---|---|---|---|
| Improved SWASH Facilities | Pearson Correlation | 1 | .248** |
| | Sig. (2-tailed) | | .004 |
| | N | 133 | 133 |
| Quality Learning | Pearson Correlation | .248** | 1 |
| | Sig. (2-tailed) | .004 | |
| | N | 133 | 133 |

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data (2025)

The correlation analysis reveals a strong positive relationship ($r = .643$, $p < .01$) between improved SWASH facilities and quality learning, meaning that better sanitation, water, and hygiene conditions in schools are associated with enhanced pupil learning outcomes. This supports findings by Sharma et al. (2024), who reported that lack of clean toilets and menstrual hygiene resources led to discomfort and reduced academic performance, particularly among girls. Similarly, Gupta and Anand (2023) emphasized that even where WASH infrastructure existed, poor usability and maintenance negatively affected students' ability to focus and learn. According to Bronfenbrenner's Ecological Systems Theory, the school environment is part of the microsystem that directly shapes a child's development; thus, improving SWASH facilities plays a critical role in fostering both academic and emotional well-being within the learning context.

The correlation analysis indicates a positive but weak relationship ($r = .248$, $p = .004$) between improved SWASH facilities and quality learning among the 133 pupil respondents. Although the strength of the correlation is modest, it is statistically significant, suggesting that better sanitation, water, and hygiene facilities do contribute to enhanced learning, even if other factors may also be influential. This finding is supported by Melaku et al. (2023), who highlighted that

inadequate WASH facilities negatively affect both student attendance and classroom performance, particularly in overcrowded and under-resourced schools. Additionally, Bick et al. (2024) emphasized the need to pair infrastructure improvements with hygiene education and maintenance to achieve meaningful gains in learning outcomes. From Bronfenbrenner's Ecological Systems Theory, SWASH facilities form a crucial part of the microsystem, where the physical school environment directly interacts with and shapes children's day-to-day learning experiences and developmental outcomes.

## CONCLUSION

Based on the findings, this study clearly shows that having clean and good sanitation facilities in schools helps improve pupil attendance. Most respondents agreed that when schools provide clean toilets, safe drinking water, and places to wash hands, pupils feel more comfortable and safer. This is especially important for girls, who may avoid school if toilets are dirty or there are no separate facilities for them. Good sanitation also helps prevent illnesses, which means fewer students miss school because of sickness. When toilets and hygiene areas are clean and working, students are more motivated to come to school every day and stay for the whole day. This not only improves attendance but also helps students learn better because they spend more time in class. While other factors like poverty, distance to school, and family responsibilities also affect whether students attend school, sanitation is one of the key reasons pupils either come to school or stay away. Therefore, schools should not overlook the importance of providing and maintaining proper water, sanitation, and hygiene (WASH) facilities. Improving these facilities creates a safe and welcoming environment, which supports students' health, confidence, and willingness to participate in learning.

## RECOMMENDATION

The study recommended that schools and education authorities take strong action to improve sanitation facilities. Schools should provide enough clean and functioning toilets, including separate toilets for girls, to ensure privacy and comfort. Safe drinking water must be available all the time so pupils can stay hydrated and maintain good hygiene. Handwashing stations with soap should be installed and regularly maintained, helping to reduce the spread of diseases. Schools need to develop plans for regular cleaning and repairs to keep these facilities in good condition. Additionally, health and hygiene education should be included in the school curriculum to teach pupils the importance of personal cleanliness and using sanitation facilities properly. Efforts should also focus on including all students, such as girls and those with disabilities, to ensure fair access to sanitation services. Beyond infrastructure, schools should work with communities, parents, and local leaders to raise awareness about the importance of school sanitation for attendance and learning. Finally, sanitation improvements should be part of broader programs that address other challenges pupils face, such as poverty and transportation difficulties. By taking these steps, schools can create a healthier, safer, and more supportive environment that encourages pupils to attend regularly and succeed in their studies.

## REFERENCES

Ahmed, I., Garfias Royo, M., Opabola, E., Nurdin, S., Meilianda, E., Idris, Y., Rusydy, I., Joffe, H. & Parikh, P. (2023). Assessment of WASH infrastructure in schools in Central Sulawesi, Indonesia using structured observations and principal interviews. *Journal of Water, Sanitation and Hygiene for Development*, *13*(6), 375-390.

Antwi-Agyei, P., Mwakitalima, A., Seleman, A., Tenu, F., Kuiwite, T., Kiberiti, S., & Roma, E. (2017). Water, sanitation and hygiene (WASH) in schools: results from a process evaluation of the National Sanitation Campaign in Tanzania. *Journal of Water, Sanitation and Hygiene for Development*, *7*(1), 140-150.

Bick, S., Ezezew, A., Opondo, C., Leurent, B., Argaw, W., Hunter, E. C., Allen, E. & Dreibelbis, R. (2024). Impact of a school-based water and hygiene intervention on child health and school attendance in Addis Ababa, Ethiopia: a cluster-randomised controlled trial. *BMC medicine*, *22*(1), 348.

Dibaba, D. B., Alemu, B. M., & Debela, S. A. (2024). Impact of water, sanitation, and hygiene (WASH) interventions on gender-specific school attendance and learning outcomes: A systematic review and meta-analysis protocol. *Plos one*, *19*(8), e0308144.

Duah, H. (2024). The level of implementation of water, sanitation, and hygiene (WASH) practices among the public basic schools in Ghana. *Journal of Water, Sanitation and Hygiene for*

*Development*, *14*(9), 780-793.

European Commission. (2020). *Water Framework Directive*. Retrieved from https://ec.europa.eu/environment/water/water-framework/index_en.html

Grimus, M. (2020). Emerging technologies: Impacting learning, pedagogy and curriculum development. *Emerging technologies and pedagogies in the curriculum*, 127-151.

Jacob, K. & Alex, I. (2024). Impact of Water, Sanitation, and Hygiene (WASH) Programs on School Attendance: A Case Study of Gayaza High School. *Metropolitan Journal of Environmental and Health Research*, *3* (12), 722-731.

McMichael, C. (2019) Water, sanitation and hygiene (WASH) in schools in low-income countries: A review of evidence of impact. *International Journal of Environmental Research and Public Health*, *16* (3), 359.

Melaku, A., Mengistie, B., & Addis, T. (2023). The status of school water, sanitation, and hygiene services in Addis Ababa, Ethiopia: progress towards achieving the SDG 6. *Environmental health insights*, *17*, 11786302231199003.

Ministry of Water. (2022). *Water Sector Development Programme Phase Three (WSDP III) 2022/232-025/26.* UTR, Ministry of Water.

MoEST. (2022). *A costed plan of action and investment case for implementation of school water, sanitation and hygiene (SWASH) services.* United Republic of Tanzania Ministry of Education, Science and Technology.

Mwesongo, C. S., & Mwakipesile, A. E. (2023). Trends for sanitation practices in Tanzania: the history from colonial to current times. *Journal of Water, Sanitation and Hygiene for Development*, *13*(4), 265-275.

Ngimbwa, J. P., Basinda, N., Kapesa, A. & Ngallaba, S. (2020). *Evaluation of the School Water, Sanitation and Hygiene National Strategic Implementation Plan (2012-2017) in Ukerewe district, north-western Tanzania*. doi:10.20944/preprints202008.0390.v1

Papanthymou, A. & Darra, M. (2023). Defining Quality in Primary and Secondary Education. International Education Studies, 16(2), 128-149.

Pasewaldt, S. E., Baller, S. L., Blackstone, S. R., & Bryan Malenke, L. (2019). Impact of a hand hygiene curriculum and group handwashing station at two primary schools in East Africa. *International Quarterly of Community Health Education*, *39*(3), 175-187.

Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: appropriate use and interpretation. *Anesthesia & analgesia*, *126*(5), 1763-1768.

Sharma, M. K., Adhikari, R., Khanal, S. P., Acharya, D., & van Teijlingen, E. (2024). Do school Water, Sanitation, and Hygiene facilities affect students' health status, attendance, and educational achievements? A qualitative study in Nepal. *Health Science Reports*, *7*(8), e2293.

Sharma, M. K., Khanal, S. P., & Adhikari, R. (2022). School Water, Sanitation, and Hygiene: A Systematic Review of Its Effect on Health, Attendance, Regularity, and Educational Achievements. *Scholars' Journal*, 1-21.

Zadock, H. B., Muasya, D., & Gichuhi, D. (2024). The relationship between the reliability of improved water service and pupils' hand washing practices in Lurambi sub-county, Kakamega County, Kenya. *African Journal of Emerging Issues*, *6*(18), 70-82.