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THE STATE OF WATER SUPPLY IN LOWER AND UPPER BASIC SCHOOLS IN REGION ONE EDUCATION DIRECTORATE: THE GAMBIA

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ABSTRACT

This research investigates the challenges and implications related to access to clean and safe water in schools in Region One education directorate, employing a mixed-methods approach. The study incorporates both quantitative and qualitative data collection methods, utilizing a questionnaire administered through face-to-face interviews with headteachers or their representatives, and qualitative data gathered through an inspection checklist. The sample size of 74 schools was determined using Slovin's formula. Findings indicate that a significant number of schools face inadequate water supply from NAWEC, highlighting challenges in accessing clean and sufficient water. Quantitative data from the questionnaire were analyzed using SPSS software version 20. The research offers a comprehensive understanding of the water supply situation in Region One schools, identifying key concerns and potential areas for improvement.

Keywords: *Water supply; Access to water; Adequate; water supply, School.*

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1. INTRODUCTION

Access to safe water, sanitation, and hygiene (WASH) facilities is a crucial element in ensuring a healthy and dignified life, and it is a fundamental human right. However, according to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), approximately 43% of schools worldwide lack access to basic handwashing facilities with soap and water, and 818 million students worldwide lack basic drinking water services (WHO/UNICEF, 2021). In sub-Saharan Africa, the majority of the 573 million school-aged children who lack access to basic drinking water services are affected, according to WHO/UNICEF (2021).

The absence of clean water and sanitation facilities can have a negative impact on the health, attendance, and educational outcomes of students. SDG6 requires that every student has access to a safe and potable water supply, which means ensuring that drinking water sources are regularly tested and meet safety standards, and appropriate treatment and filtration systems are in place to remove contaminants (UN, 2015). Moreover, schools must provide adequate drinking water facilities, including water fountains, taps, and water dispensers, that are accessible to all students and staff.

The Gambia has made significant progress in improving access to safe and improved sources of drinking water. According to The Gambia Country Brief (2019), 80% of the population uses safe and improved sources of drinking water, as reported by the Joint Monitoring Programme on Water and Sanitation in 2017. However, the country still faces challenges in achieving

the SDG 6 target for access to basic sanitation, especially in rural areas, schools, and healthcare facilities.

To address this challenge, there is a pressing need for increased attention and commitment to ensuring equitable access to safe drinking water and sanitation services in schools. The provision of these facilities can help create a healthy and conducive learning environment for students and staff (UNICEF, 2019). The findings of this research are useful for policymakers, education stakeholders, and international organizations interested in promoting access to safe drinking water and sanitation services in schools and other public institutions.

2. REVIEW OF LITERATURE

This section focuses on the conceptual framework and the theoretical framework.

2.1 Conceptual Framework

The concept of water supplies in schools refers to the availability, accessibility, and quality of water provided to educational institutions for various purposes, including drinking, sanitation, hygiene, and other educational activities. Access to clean and sufficient water is essential for maintaining a healthy and conducive learning environment for students and staff. Schools need a consistent and reliable water supply to meet the daily needs of students and staff. Adequate water availability ensures that essential activities, such as drinking, cooking, cleaning, and sanitation facilities, can function effectively. Water availability is a critical factor for schools to function effectively in providing for the daily needs of students and staff. It encompasses access to a consistent and reliable supply of

water necessary for various essential activities such as drinking, cooking, cleaning, and maintaining proper sanitation facilities. Without adequate water availability, schools face significant challenges in maintaining a healthy and conducive learning environment. The availability of clean drinking water is essential for the health and well-being of students and staff. Lack of access to safe drinking water can lead to waterborne diseases and adversely affect students' attendance and academic performance. According to a report by UNICEF and WHO (2019), around 1 in 3 schools worldwide lack access to safe drinking water, highlighting the urgent need for improved water availability in educational settings. Adequate water availability is needed to support proper sanitation and hygiene practices in schools. Handwashing facilities with running water are essential for promoting good hygiene habits among students. Furthermore, adequate water availability is essential for supporting proper sanitation facilities. Students and staff need access to clean water for handwashing, which is one of the most effective measures in preventing the spread of diseases and maintaining good hygiene practices. According to the World Health Organization (WHO) (2021), proper handwashing can reduce the risk of diarrhea by up to 47% and respiratory infections by up to 23%.

The quality of the water provided to schools is important for ensuring the health and well-being of students and staff. Clean and safe drinking water is essential to prevent waterborne diseases and maintain proper hygiene. The quality of water provided in educational institutions has a direct impact on the overall health of the school community. According to the World Health Organization (WHO) (2021), waterborne diseases, such

as diarrhea and cholera, are major causes of illness and death worldwide, especially in areas with inadequate access to safe drinking water. Contaminated water can harbour harmful pathogens and pollutants, making students and staff vulnerable to various infections and illnesses. Water quality in schools is not only essential for drinking purposes but also for maintaining sanitation facilities. Properly sanitized restrooms and washing facilities rely on clean water to ensure hygiene standards are met. Contaminated water used for cleaning and sanitation can exacerbate health risks and undermine efforts to maintain a safe and healthy learning environment. To ensure the provision of clean and safe drinking water in schools, regular water quality testing and monitoring are necessary. Water sources must be regularly checked for potential contaminants, and appropriate water treatment methods should be employed to ensure water meets quality standards. Collaboration between educational authorities and relevant health and environmental agencies is crucial in implementing effective water quality management practices in schools. The World Health Organization (WHO) and UNICEF (2019) recommend continuous monitoring of water quality to provide a safe drinking water supply in schools and prevent waterborne diseases. The World Health Organization (WHO) sets guidelines for drinking water quality. These standards are set by regulatory authorities and organizations to safeguard public health and prevent waterborne illnesses. The specific acceptable water quality standards may vary depending on the region and country. These are some common parameters considered in establishing water quality standards for schools: Microbial Contaminants: Total coliforms should be absent in 100 mL of water, and

Escherichia coli (E. coli) should not be detectable in any 100 mL sample. Chemical Contaminants: Specific limits are set for various chemical parameters such as nitrates, lead, arsenic, and fluoride to ensure their levels do not pose health risks to students and staff.

Access to water is closely linked to sanitation and hygiene practices in schools. Proper handwashing facilities and clean water are essential for promoting good hygiene habits among students, which, in turn, reduces the risk of infections and illnesses. Handwashing is one of the most effective measures to prevent the transmission of germs and infections. Access to proper handwashing facilities, including clean water, soap, and towels or hand dryers, encourages students and staff to practice regular handwashing. The Centers for Disease Control and Prevention (CDC) stresses that handwashing with soap and water for at least 20 seconds is essential in reducing the spread of germs (CDC, 2021). Schools become essential in promoting good hygiene practices among students. Educational programs and campaigns focused on hand hygiene, personal hygiene, and proper sanitation can instill positive habits that students can carry into their daily lives. Studies have shown that hygiene education in schools can lead to a significant reduction in the incidence of waterborne diseases (Lau, 2020). Proper sanitation and hygiene practices contribute to improved health and reduced absenteeism in schools. When students and staff practice good hygiene, the risk of contracting and spreading infectious diseases decreases, leading to a healthier school community. A study conducted by the World Health Organization (WHO) found that promoting hygiene in schools can reduce absenteeism by 21% (WHO, 2021). Access to clean

water and proper sanitation facilities is vital for addressing menstrual hygiene needs among female students. Adequate facilities for menstrual hygiene management can positively impact girls' attendance and comfort during menstruation (UNICEF, 2018). The integration of Water, Sanitation, and Hygiene (WASH) in school programs is an effective approach to ensure proper hygiene practices. Such programs address the infrastructure, education, and behavior change necessary to achieve comprehensive water and sanitation management in schools (UNICEF & WHO, 2019).

2.2 Theoretical Framework

The theoretical framework for understanding the state of water supply in lower and upper basic schools in Region One Education Directorate can be based on the "Socio-Ecological Model" and the "Human Rights Approach to Water and Sanitation".

i. The Socio-Ecological Model is a comprehensive framework that analyzes the interaction between individuals and their social and physical environments. It considers how factors at multiple levels influence behaviors, attitudes, and access to resources like water supply. At the individual level, factors such as knowledge, attitudes, and practices regarding water usage and hygiene play a role. This includes the students, teachers, and staff in the schools. The interpersonal level involves the influence of social networks and relationships on water supply practices. Peer influence, support from colleagues, and community engagement can impact water conservation efforts and access to resources. The Organizational Level addresses the influence of the school's organizational structure,

policies, and resources on water supply. The availability of budgets, maintenance procedures, and infrastructure directly affect the state of water supply in schools. At the Community Level, norms, cultural beliefs, and community resources can influence water availability and access in schools. Collaboration with local authorities and community stakeholders can contribute to sustainable water management. The Policy Level provides Government policies and regulations in shaping water supply standards in schools. Compliance with these policies ensures safe and adequate water services. The Environmental Level considers the availability of water sources, water quality, and the impact of environmental factors such as climate change and water scarcity can affect water supply in schools.

ii. The human rights approach to water and sanitation emphasizes that access to clean water is a fundamental human right. This framework promotes the understanding that water supply in schools is not just a matter of convenience but an essential requirement for the well-being and dignity of students and staff. Schools should have access to a sufficient quantity of clean and safe water to meet the needs of students and staff. Water supply should be easily accessible within school premises, especially for vulnerable groups such as children with disabilities. Water should meet acceptable quality standards, be free from contamination, and be safe for consumption. Water services should be affordable, and financial constraints should not impede access to clean water. Involving students, staff, and the broader school community in decision-making related to water supply fosters a sense of ownership and responsibility. Schools and relevant authorities should be accountable for

maintaining and improving water supply services in line with human rights principles.

3. METHODOLOGY

To assess the state of water supply in schools in the Region One Administrative Area, a mixed-methods research design was used. The quantitative data were collected through a cross-sectional survey using a questionnaire in a face-to-face interview with the headteacher or anyone acting on his behalf. The data collection took 2 months to reach all the schools identified in the sampling process. The questionnaire assessed the availability and quality of water supply, as well as the adequacy of WASH facilities in the schools. furthermore, qualitative data was also collected through an inspection checklist, which assessed the physical condition and functionality of the water supply and sanitation facilities in the schools. The data was analyzed using both content and thematic analysis. The inspection was carried out by a public health and sanitation expert who visited the schools and observed the water supply and sanitation facilities. The use of both quantitative and qualitative data collection methods provided a comprehensive understanding of the state of water supply in schools in the region. The quantitative data was analyzed using SPSS that provided statistical information on the prevalence and distribution of water supply and sanitation facilities in schools, while the qualitative data provided in-depth insights into the conditions and functionality of the facilities.

To ensure a representative sample of schools, a list of Lower and Upper Basic Schools in the Region One Education

Directorate was obtained from the office, and each school on the list was assigned a unique code. To randomly select schools to participate in the study, a random number table was used to select the required number of schools enrolled in the research.To determine the appropriate sample size for the study, Slovin's formula was applied, taking into account the total number of schools in the Region One Education Directorate. Using a 90% confidence interval, a sample size of 66.10 was generated. To ensure accuracy and representation, the sample size was rounded up to 70 schools, with an additional four schools considered for non-response or inaccessibility. In total, the study's actual sample consisted of 74 schools.

n= N/1+Ne2
n = 195 / (1 + 195(0.1^2)
n = 195 / (1 + 1.95) n = 195 / 2.95 n ≈ 66.10
rounded to the nearest 10= 70+4= 74.

The quantitative data was analyzed using SPSS, while excerpts and direct quotations were used to analyze the qualitative data.

4. RESULTS

The results of this survey are herein presented below.

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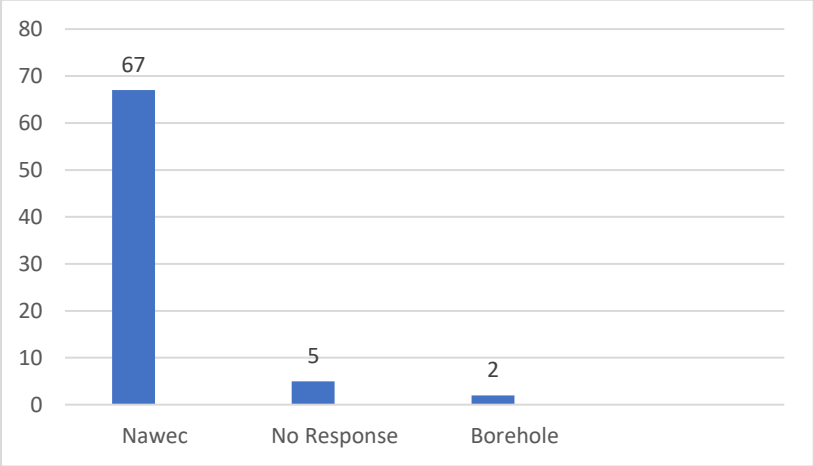

Figure 1. Bar-chart Showing the Sources of Water Supply in the School

Field survey 2023

90.5% (n=67) of the school get their water supply from Nawec,6.8%(n=5) of the schools did not respond, while the remaining 2.7% (n=2) has a borehole as the source of water supply.

"Not adequate as in everywhere" (CL_1UBS_1). "Not adequate at all. By 0900hrs no water from NAWEC" (CL_1BCS_1). "Not Adequate, it fluctuates" ($CL_{10}LBS_8$). "Not adequate, there is a borehole" (CL_9UBS_1). "Not adequate because it is not consistent" ($CL_{11}LBS_3$). "Not adequate, I have to collect water drums at home every school day" (CL_6LBS_1). "Not adequate, but supplemented by a borehole" (CL_3LBS_1). "Not adequate at all" (CL_4LBS_{13}). "Inadequate" (CL_4LBS_4). "Adequate, but supplemented by a borehole" (CL_4LBS_8).

Q3 If supply is obtained from NAWEC how adequate is the supply

	Frequency	Percent	Cumulative Percent
Non response	8	10.8	10.8
Adequate	17	23.0	33.8
Adequate but, supplemented by a borehole	8	10.8	44.6
Not Adequate	8	10.8	55.4
Not adequate as in everywhere	3	4.1	59.5
Not adequate at all	1	1.4	60.8
Not adequate at all. By 0900hrs no water from NAWEC	1	1.4	62.2
Not adequate because it is not consistent	1	1.4	63.5
Not adequate, I have to collect water drums at home every school day	1	1.4	64.9
Not Adequate, it fluctuates	1	1.4	66.2
Not adequate, but supplemented by a borehole	25	33.8	100.0
Total	74	100.0	

Field survey 2023

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Q4_If_supply_not_adequate_what_other_measures_do_you_have

		Frequency	Percent	Valid Percent	Cumulative Percent
	Store water in uncovered drums	1	1.4	5.9	5.9
	Store water in covered drums	5	6.8	29.4	35.3
	Filled overhead tanks	7	9.5	41.2	76.5
	Others	4	5.4	23.5	100.0
	Total	17	23.0	100.0	
Inadequate water supply from NAWEC		57	77.0		
Total		74	100.0		

Field survey 2023

Of the 77% (n= 57) of the schools that claimed NAWEC supply was inadequate, 30% (n=17) of the respondents used supplementary approaches to store water such as uncovered water drums, covered drums, overhead tanks, and other means to ensure that water is adequate for the day's activity. Out of the 30% (n=17) who developed supplementary approaches, 41% (n=7) used filled overhead tanks, 29% (n=5) used covered water drums, 24% (n=4) used other approaches, while the remaining 6% (1) used uncovered drums.

Table 1. Showing use of overhead tanks with varying capacities as supplementary sources of Water supply

	Frequency	Percent
1000 litres	1	3.8
12000 litres	1	3.8
2000 litre	1	3.8
2000 litres	8	30.8
2000litres	2	7.7

2500 litres	1	3.8
3000 litres	3	11.5
3000Litres	2	7.7
4000 litres	3	11.5
5500 litres	2	7.7
6000 litres	1	3.8
7000 litres	1	3.8
Total	26	100

35.1% (n=26) of the schools have overhead tanks as supplementary sources of water. Out of this 35.1 (n=26), 30.8% (n=8) of the schools have a 2000-litre capacity tank,11.5% (n=11.5) of the schools have a 3000 and 4000-litre capacity tanks respectively, 7.7% (n=2) of the schools have a 3000 and 5500 litres tank capacity respectively as well as 1000, 2000, 6000, 70000, and 12000-litre tank capacity in other schools as well.

5. DISCUSSION

Access to clean and safe water is essential for ensuring the health and well-being of individuals, particularly children who are still growing and developing. In schools, access to clean water is not only necessary for drinking but also for hygiene and sanitation purposes, which can significantly affect the health of students and staff. The United Nations recognizes access to safe water and sanitation as a basic human right, and this right is extended to education as a right.

In The Gambia, the National Water and Electricity Company (NAWEC) is the primary institution responsible for the provision of water supply services to the population, including schools. As noted in the research findings, 90.5% of schools in the study

relied on NAWEC as their primary source of water supply. NAWEC's role in the provision of water supply services in The Gambia is crucial, as it is the only institution providing such services to the people. The company extracts water from boreholes located in various parts of the country and pumps it to the purification and treatment centre for treatment before distribution to the main reservoirs for final distribution to consumers. The purification and treatment of water by NAWEC ensure that the water supplied to schools and other consumers is safe and clean. The treatment process involves the removal of impurities, including harmful chemicals, bacteria, and other contaminants that may be present in the water. This process is essential in ensuring that the water supplied to schools is safe for human consumption and meets the WHO's standards for potable water. Amoah et al. (2018) highlighted the importance of water treatment in ensuring the quality of water supplied to schools. But the study found that water supplied to schools in Ghana had high levels of bacteria, including faecal coliforms and E. coli, which are indicators of faecal contamination. It is important to acknowledge that the supply chains for water may not always be flawless, and there can be challenges along the way that lead to possible contamination before the water reaches the end consumer. Even after being treated and purified, the water may encounter issues during transport or distribution, which can impact its quality. (Abraham et al., 2018) posited that even when water is treated and purified at the source, it can become contaminated during transport and storage in households, leading to microbiological contamination and increased risk of waterborne diseases,

Evidence of this is the presence of bursts or exposed water pipes, particularly in urban areas where the infrastructure may be older and more prone to deterioration. These pipes can potentially contaminate the water by allowing outside elements to enter the water supply. Odeyemi et al., 2019 reported that water quality deteriorates during distribution due to issues such as leakages in pipes, illegal tapping, and lack of maintenance, which can result in microbial contamination. It is important to note, however, that this research did not investigate or measure these potential sources of contamination. It is therefore important to remain vigilant and ensure that water quality is regularly monitored and tested to ensure that it meets the necessary standards for safe consumption. In addition to NAWEC, some schools in the study area also rely on borehole sources for their water supply. As indicated in the research findings, 2.7% (n=2) of the schools that participated in the study had boreholes as their primary source of water supply. Boreholes are generally considered to be reliable and consistent sources of water supply, and they can be particularly useful in areas where NAWEC supply may be inconsistent or inadequate.

However, while boreholes may be reliable sources of water, they can still pose some challenges in terms of water quality. Unlike NAWEC, which has established treatment and purification processes, boreholes may not always have access to the same resources or expertise to ensure that the water they provide is safe and clean. As a result, there may be concerns about the potential for contaminants to be present in the water. Ojoawo and Adekunle (2021), posited that the quality of water from boreholes was generally poor, with high levels of total coliform, faecal coliform, and turbidity. Boreholes

are generally not subject to the same risks of contamination from burst or exposed pipes as with NAWEC supply. In the study area, for example, water pipes may be more likely to become damaged or contaminated, which can impact the quality of the water that is distributed to schools and other consumers. With boreholes, however, the water is drawn directly from the source and transported to the school without passing through pipes or other infrastructure that could lead to contamination. Piped water sources had higher levels of faecal contamination compared to borehole sources, likely due to the risks of contamination from broken or leaky pipes. In contrast, boreholes were less likely to be contaminated as they were not subject to the same risks from infrastructure as piped sources (Pennington et al., 2019)

The adequacy and consistency of water supplies are critical factors that affect access to water in schools. Without adequate and consistent water supplies, schools may struggle to meet the basic needs of students, including providing safe and clean water for drinking, handwashing, and sanitation facilities. In many developing countries, including The Gambia, water supplies can be unreliable and inconsistent.

The research findings indicate that a significant number of schools in the study area experience inadequate water supply from NAWEC, with 77% (n=57) of the schools reporting this issue. Inadequate water supply in this context refers to the situation where the amount of water provided by NAWEC is not sufficient to meet the needs of the schools, particularly in terms of drinking, handwashing, and flushing after using the toilet. This indicated that the water supply provided by NAWEC

may not be consistent or reliable enough to meet the daily needs of the schools. Ameyaw et al. (2019) highlighted the prevalence of inadequate water supply in schools in Sub-Saharan Africa and the need for improved access to safe and sufficient water for students and staff. According to the UNICEF/WHO Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), the minimum water consumption level for schools in Sub-Saharan Africa should be at least 15 liters per student per day for drinking and basic hygiene needs. Access to safe and adequate water is crucial for promoting good hygiene practices and preventing the spread of diseases, particularly in environments such as schools where a large number of students and staff members gather daily.

However, the research findings reveal that some of the schools in the study area faced serious challenges with water access, with evidence of exposed human excrement noted in some of the worst-affected schools. This indicates that inadequate access to water not only affects the ability of students and staff to engage in basic hygiene practices such as handwashing and flushing after using the toilet but can also pose significant health risks. The presence of exposed human excrement is particularly concerning as it can be a breeding ground for diseases such as cholera and typhoid fever. The high percentage of schools reporting inadequate water supply from NAWEC in the study area highlights the significant challenges in providing access to safe water in schools. Without sufficient water supply, students and staff may not be able to maintain proper hygiene practices, such as washing their hands frequently, which can increase the risk of contracting illnesses and diseases. inadequate water supply can affect the learning environment, as students may be

forced to miss classes or use unsanitary facilities due to the lack of water for flushing toilets or cleaning. The lack of water for flushing toilets and maintaining cleanliness can lead to unsanitary conditions in the school environment. This can result in the disruption of classes as students and teachers may need to leave the premises in search of suitable facilities or to address hygiene-related issues (UNESCO, 2017). During the field survey, evidence of unsanitary conditions, including instances of open defecation, was observed in some schools. Open defecation refers to the practice of individuals openly defecating in areas without proper toilet facilities, exposing human waste to the environment. The presence of open defecation in schools is a concerning issue as it poses serious health risks and undermines the overall hygiene and sanitation standards within the educational environment. Open defecation can lead to the contamination of the school premises, surrounding areas, and water sources, contributing to the spread of diseases such as cholera, diarrhea, and other waterborne illnesses (World Health Organization, 2019). The existence of open defecation in schools can have psychological and social implications. Students may feel ashamed or embarrassed, leading to a negative impact on their self-esteem and overall learning experience. The lack of proper toilet facilities and the practice of open defecation can also perpetuate gender inequalities, particularly affecting girls who may face additional challenges and discomfort in managing their menstrual hygiene needs (WaterAid, 2017).

Caruso et al. (2018) highlighted the significance of alternative water sources, such as boreholes and water vendors, in urban schools. These additional sources can help to boost the water

demand and ensure that students and staff have access to sufficient water for various purposes. The research findings indicate that a significant proportion of schools, specifically 77%, face inadequate water supply. However, instead of being reluctant to address this challenge, the schools in the study have taken the initiative to generate supplementary approaches to meet the water demand. One of the common methods employed by these schools is the use of drums for storing supplementary water to fulfill their daily consumption needs. Both covered and uncovered drums are utilized for water storage purposes. The use of covered drums as a supplementary water storage method is beneficial in terms of protecting the water from external contaminants. However, it is important to acknowledge that there is still a possibility of cross-contamination or recontamination during the water retrieval process. A single tumbler is permanently fixed or stationed at the top of the drum. This tumbler serves as a means for users to access the water by immersing the gadget into the drum to fetch water. There are potential sources of contamination to consider. The primary sources of contamination in this case are the hands of the users and the exposed tumbler used for dispensing water. If users have not properly washed their hands before handling the tumbler upon accessing the water, they may introduce contaminants into the drum. The tumbler itself, if not properly cleaned and sanitized between uses, can become a potential source of contamination. Moreover, regular cleaning and sanitization of the tumbler are necessary to prevent bacterial growth and maintain water quality. While the covered drum provides a protective barrier against physical and external contaminants, the potential for

contamination exists due to frequent openings by various users at different times. It is worth noting that the effectiveness of these measures relies on the cooperation and understanding of the users. The utilization of uncovered drums as a supplementary water storage method poses significant risks to water quality and increases the potential for contamination. Without a cover to protect the water from external and physical contaminants, the likelihood of pollution is considerably higher. Consequently, using water from these uncovered drums for drinking purposes is strongly discouraged and not recommended. During the field survey, it was observed that these uncovered drums were often situated in close proximity to the toilet area. This proximity raises concerns about the potential for cross-contamination between the stored water and unsanitary conditions present in the vicinity. The use of drums as water storage containers enables schools to have a reserve supply of water that can be used for hygiene, sanitation, and other essential purposes.

In addition to using drums, some schools in the study area employed another alternative approach to supplement their water supply: filled overhead tanks. These tanks come in various capacities, ranging from 500 litres to 12,000 litres. For schools using this approach, there are two common methods of filling the overhead tanks. The filling of these tanks is carried out during periods when the NAWEC supply is available and active. In this method, the water is sourced directly from the NAWEC water network, typically through a dedicated pipeline or connection. The water flows into the overhead tank through gravity or with the assistance of a pump. In the other approach, the tanks are filled using water supplied by a borehole that is

connected to an automatic pumping system. This system ensures that the tank is refilled as soon as the water level drops below a certain threshold. This approach provides a continuous and consistent water supply to meet the needs of the school community. The utilization of overhead tanks offers several benefits. It ensures an uninterrupted water supply, addressing the issue of inadequate water supply experienced by many schools in the study area. With the availability of a reserve water source in the overhead tanks, schools can rely on this supplementary supply during periods of limited or inconsistent NAWEC supply. The use of overhead tanks helps to balance the demand for water throughout the day. Schools often experience peak water usage during specific periods, such as break times or when students and staff use the toilet facilities simultaneously.

6. CONCLUSION

In conclusion, the research findings emphasize the importance of access to clean and safe water in schools and the challenges faced in meeting this need. In this study, the National Water and Electricity Company (NAWEC) was the primary source of water supply for the majority of schools, while some schools relied on boreholes. However, both sources presented certain concerns regarding water quality. The study underscored the significance of water treatment and purification processes carried out by NAWEC to ensure the supplied water is safe and meets the necessary standards. However, issues such as burst or exposed water pipes in urban areas and lack of maintenance in distribution systems can lead to contamination during transport and distribution.

The research also pointed out the inadequate and inconsistent water supply experienced by a significant number of schools. This scarcity of water impacted the ability of schools to meet the basic needs of students and staff, compromising hygiene practices and increasing the risk of waterborne diseases. In some cases, evidence of unsanitary conditions, including open defecation, was observed, further highlighting the urgent need for improved access to safe water in schools.

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