International Journal of Education and Social Science Research

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, page no. 126-141

To cite this article: Hellen Saronga, Imelda Gervas and Prisila Mkenda (2024). DISPARITIES IN WATER ACCESSIBILITY IN PRIMARY SCHOOLS: INSIGHTS FROM MVOMERO DISTRICT, TANZANIA, International Journal of Education and Social Science Research (IJESSR) 7 (5): 126-141 Article No. 978, Sub Id 1539

DISPARITIES IN WATER ACCESSIBILITY IN PRIMARY SCHOOLS: INSIGHTS FROM MVOMERO DISTRICT, TANZANIA

Hellen Saronga[1]*, Imelda Gervas[2] and Prisila Mkenda[3]

[1]Department of Curriculum and Instruction, School of Education-Sokoine University of Agriculture, Morogoro-Tanzania.

[2]Department of Education Foundations and Administration, Sokoine University of Agriculture, Morogoro, Tanzania.

[3]Department of Biosciences, College of Natural and Applied Sciences, Sokoine University of Agriculture, Morogoro, Tanzania.

DOI: https://doi.org/10.37500/IJESSR.2024.7511

ABSTRACT

Water is a crucial need in schools as it supports healthy practices and other important school activities. This study investigates water availability situation in primary schools of Mvomero district of Tanzania. The study utilized a descriptive design. A sample of four primary schools was selected, and data were gathered from 300 students and 23 teachers using questionnaires. The study utilized various aspects as indicators for water scarcity condition including accessibility by distance, sufficiency for various activities, water infrastructures conditions and cleanliness of the water provided at school. Findings revealed disparities in water availability across different schools. 2 of the sampled schools had water scarcity whereas the other 2 had no water scarcity. Schools with water scarcity obtained water from longer distances, infrastructures were not functional, water for various activities was not sufficient and the water was not clean unlike schools with no water scarcity. It was recommended that investments in water infrastructure construction and maintenance should be prioritized in the affected schools. Also, training on water management practices and engaging local communities to support schools with scarcity could serve as important initiatives towards dealing with this problem.

KEYWORDS: Water scarcity, Primary schools, Infrastructure, Academic engagement, Tanzania.

INTRODUCTION

Access to clean and sufficient water is a serious issue in some areas, affecting education. Studies from 2019 to 2024 have shown how water quality, availability, and sanitation impact education. In rural China, research by Li et al. (2019) found that water quality issues like chemical contamination led to absenteeism and poor academic performance among schoolchildren. Similarly, Khan et al. (2020) in Pakistan reported increased absenteeism and lower academic achievement due to inadequate sanitation and clean facilities, which depend on having enough water.

In urban settings, Garcia et al. (2022) studied Brazilian slums and found that poor water supply not only harmed the physical health of schoolchildren but also caused stress and anxiety, hindering their participation in learning. Gender differences make these challenges worse. Ahmed et al. (2023) found that in patriarchal societies, girls often have to collect water, reducing their time for school and activities. In Sub-Saharan Africa, Wada et al. (2021) and Makundi et al. (2023) highlighted how water scarcity affects schooling, particularly for young women who juggle school and fetching water for their families. Given these issues, researchers suggest a holistic approach to tackle water accessibility problems. Comprehensive WASH (Water, Sanitation, and Hygiene) interventions, discussed by Khan et al. (2020), could improve hygiene practices by ensuring enough water and sanitation facilities in schools, thus improving educational experiences. Garcia et al. (2022) also called for collaboration among researchers, policymakers, and communities to create sustainable solutions for different regions.

As reported by Ngomuo and Msoka (2018) Mvomero district is one of the areas in Tanzania facing water scarcity. This issue affects various sectors, including schools. The study simply aims to ascertain the water scarcity conditions in primary schools within this district. Access to water is essential for maintaining students' health and creating a conducive learning environment. However, some schools may have consistent access to water, while others face significant shortages. By investigating these conditions, the study seeks to shed light on the extent of the problem and offer insights into potential solutions to improve water access in schools. Therefore, indicators such as water accessibility by distance, sufficiency for various activities, water infrastructure condition and quality of water provided at school were used to judge whether a school has water scarcity or not.

Theoretical framework

This study is guided by the theoretical of Abraham Maslow on human needs. The Maslow's hierarchy of needs emphasizes the fulfilment of fundamental physiological needs including water before higher-order psychological needs. These needs are hierarchical therefore the fulfilment of the lower needs ultimately results to the achievement of higher needs. Recent scholarly work by Moyo et al. (2019) in Zimbabwe support this framework, highlighting the significant connection between access to clean water in schools and academic performance, as well as the health implications of inadequate water supply leading to frequent illness among students. Additionally, research by Kamau and Mwenda (2020) in Tanzania underscores the gendered impact of water scarcity on educational participation, particularly for girls, who face increased school dropout rates due to water-related responsibilities. Study by Gebremariam et al. (2021) in East Africa emphasize how water scarcity in schools can affect students' sense of belonging and well-being, while Ngowi et al. (2020) in Tanzania highlight the importance of addressing water scarcity to fulfill students' esteem needs and promote a conducive learning environment. Furthermore, Ochieng et al. (2021) in Kenya caution against overreliance on municipal water supply, advocating for sustainable solutions to ensure uninterrupted access to water for educational purposes. Together, these scholarly works provide empirical evidence supporting the application of Maslow's Hierarchy of Needs to the study's findings, illustrating how water scarcity impacts various aspects of students' well-being and educational experiences, ultimately influencing their ability to fulfill their physiological, safety, belongingness, esteem, and self-actualization needs within the educational setting.

METHODOLOGY

Research approach and design

The study employed a mixed research approach to comprehensively gain information regarding the water scarcity condition of the schools. Mixed approach was chosen since it allows the obtaining of both qualitative and quantitative information which enrich each other to ensure comprehensiveness in addressing the research questions. The design was a concurrent triangulation. The design was appropriate since it allowed for gathering both quantitative and qualitative data simultaneously so as to explain the water situation of the sampled schools.

Population and sampling

The population comprised of primary school students and teachers in the district, from which a sample of four schools were selected randomly. Data were gathered from 300 students and 23 teachers using a questionnaire. The sampling procedure for students was stratified random sampling where standard five to seven classes were chosen purposively considering that they could be old enough to provide pertinent information compared to their younger counterparts. In School A standard four students were used since it is the highest class in that school. Within each class in each of the schools with standard five to seven 30 pupils were randomly selected making a total of 90 pupils from each of each of the schools. The school where only standard four pupils were used, the number was 30 pupils. Hence, the total student’s sample was 300.

Data collection tools

The data were collected by a questionnaire consisting of close ended questions of various kinds such as dichotomous, Likert scale, and multiple-choice questions depending on what that particular item intended to capture. A questionnaire with such kind of items was opted so as to ensure gaining of easily quantifiable information. Also, an interview guide was utilized to ensure systematic and well guided interview sessions with teachers.

Validity of the data collection tool

To ensure the validity of the data collection tool, important measures were implemented. The content validity procedure was followed, where the questionnaire and interview guide were presented to experts for a review of their appropriateness in capturing what is intended and suggestions provided were diligently worked upon. Moreover, to ensure easy understandability particularly for students the questionnaire was translated to Swahili language.

Data analysis

The collected quantitative data were coded and analyzed by the assistance of SPSS version 26. Descriptive statistics, specifically percentages were obtained. The findings were presented using figures and tables to facilitate easy interpretation and comprehension. The qualitative data were analyzed following the thematic analysis procedure where specific themes relating to infrastructure conditions, water quality and water sufficiency were checked from the participants narrations regarding the water scarcity condition in the schools.

FINDINGS

Water accessibility by distance

Table 1: **Distance in accessing water for school use (N=23)**

SCHOOL	**WATER ACCESSIBILITY BY DISTANCE**					
	Within school premises	100m from school premises	100 to 500 meters	500 meters to 1km	More than 1km	**Total**
School A	0	0	0	0	5	5
School B	7	0	0	0	0	7
School C	5	0	0	0	0	5
School D	0	0	0	0	6	6
Total	12	0	0	0	11	23

Water accessibility was determined by asking teachers on where water for school uses is obtained and if out of the school how far is the source from school premises. Table 3 shows the estimated distance pupils go to gain water for school uses. In School A and School D teachers reported that their water source was more than 1 kilometer away from the school premises in contrast to School B and School C whose water sources were within the school premises. This indicates poor water accessibility for school members in School D and School A

Water infrastructure condition

International Journal of Education and Social Science Research

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

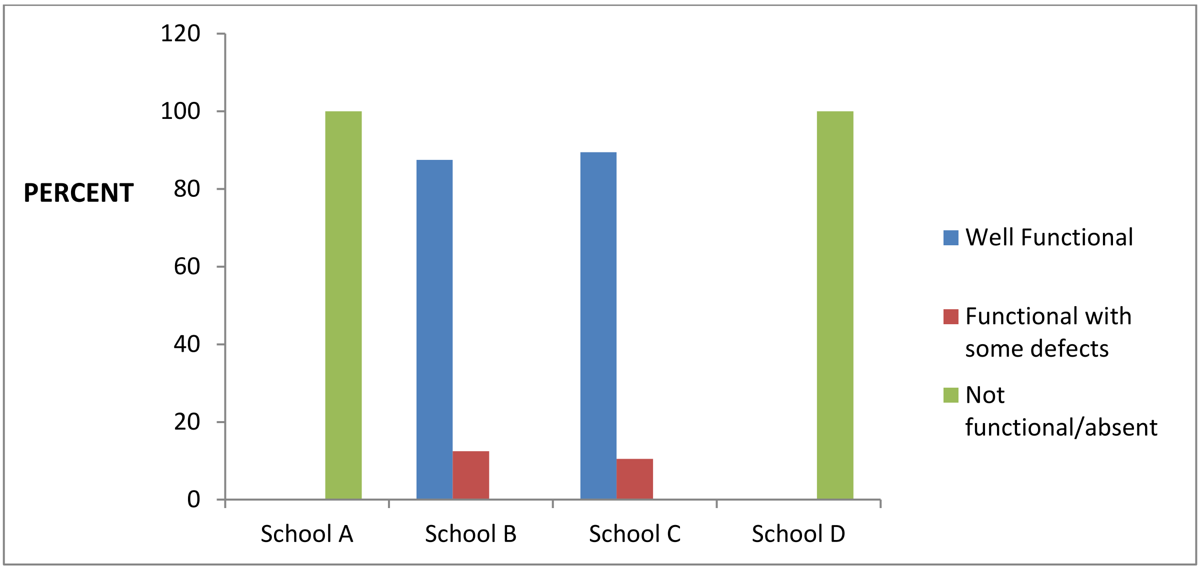


Figure 1: Functionality of water infrastructures in different schools

The data on figure 1 presents reports from teachers and students regarding the condition of water infrastructure in the schools. All sampled teachers from School A and School D (100%) reported that the water infrastructures within the school are not functional unlike the teachers in School c and and School B where 87.5% and 89.5% respectively reported the infrastructures to be well functioning. Though in the schools where majority of teachers reported well functional infrastructures, 12.5% and 10.5% claimed that despite being functional they possess some defects. Supplemental information regarding infrastructure condition was provided from interviews with school heads. The information provided by school heads of the four schools aligned with the results from the quantitative data indicating obtained from the questionnaire responded to by teachers and students. For instance, the school heads of School D and School A maintained that the water infrastructures are non-functional and unavailable respectively. The school head of School D stated

"There were functional infrastructures here but heavy rains damaged them. Since then they remained non-functional and unable to provide water to the school so we depend on swamp water and water brought by students from home"

A similar situation was stated by the school head of School A

"This is a new school no any water infrastructures have been placed here and generally in this area both within the school and in homes water is a problem"

Photograph 1 and Photograph 2 show the damaged water infrastructures at school D.

Photograph 1: Non-functional water meter and School D

Photograph 2: Damaged hand pump at School D

The school heads of School c and School B described a similar situation for their schools, consistently declaring that the water infrastructures are non-defective and ensure availability of water in the school. Infrastructures such as boreholes, storage tanks are available in these schools. The school head of School c explained

"The school had water scarcity in the past few years, but the Islamic foundation facilitated construction of boreholes and brought tanks to the school"

International Journal of Education and Social Science Research

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

The school head of School B stated

"Currently we do not have water shortage the water infrastructures here are boreholes and storage tanks"

As shown in photograph 3 there is a water tank with a tap at School B. The water tank is connected to a borehole which is the source of water.

Photograph 3: Water tank connected to a borehole and a tap at School B primary school

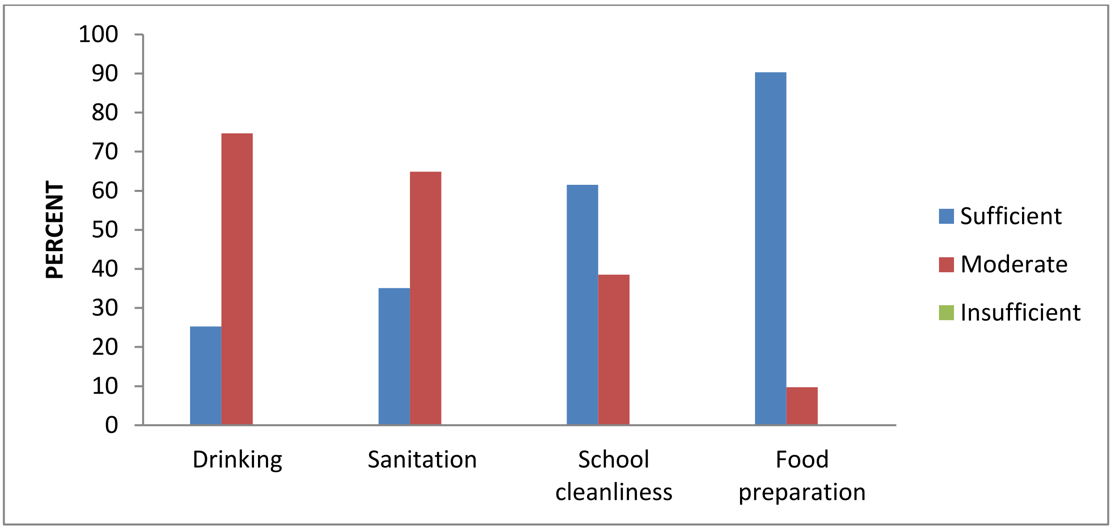
Sufficiency of water for various activities

Figure 2: Water sufficiency for various uses at School C

International Journal of Education and Social Science Research

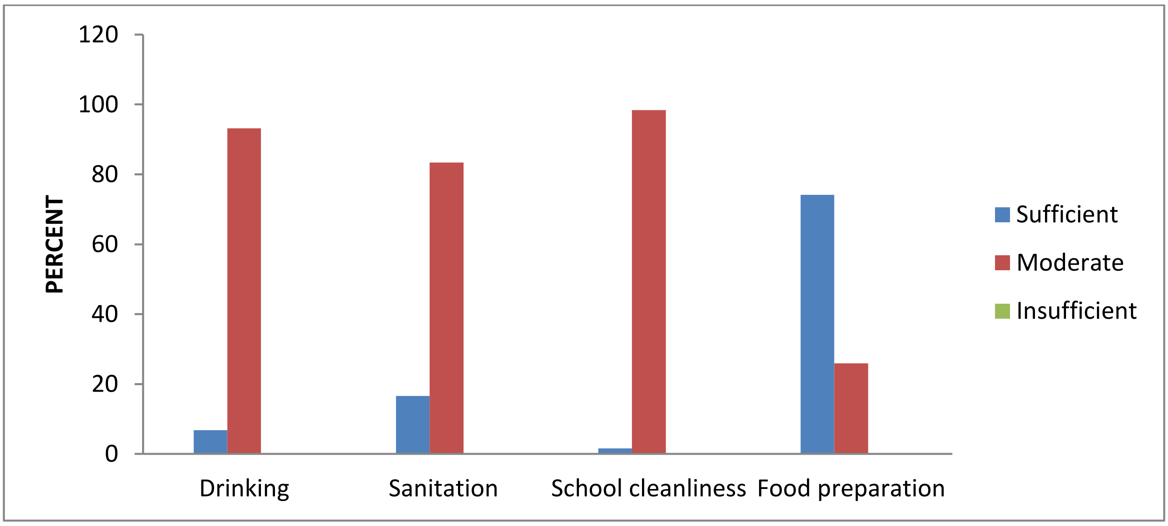
ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141



The sufficiency of water for various activities at School c school as rated by teachers and students is presented on figure 2. About three quarters of the respondents (74.7%) rated the sufficiency of drinking water as moderate whereas a quarter of them (25.3%) rated water for this activity to be sufficient within the school. Also, most of the respondents rated the sufficiency as moderate for sanitation activities (64.86%). With regards to school cleanliness and food preparation most students rated water for these activities to be sufficient, the ratings were 61.53%and 90% respectively. The moderate part of the scale meant that water was adequate but with some occasional shortages. From the interview, the school head further confirmed that there is sufficient water for those activities in the school. He stated that

"Before the improvement of the water situation here we had to send students to fetch water from nearby homes because even just getting water for toilet use was hard but now, we have plenty to use for drinking, cleaning the school and even tea preparation"



ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

Figure 3: Water sufficiency for various uses at School B

Ratings on water sufficiency at School B primary school shown on figure 3 seem somewhat similar in pattern to the ones at School c. In exception to sufficiency for food preparation, the sufficiency of water for other activities was rated as moderate by most respondents. Most respondents rated the water quantity for food preparation to be sufficient (74.1%) whereas 25.9% regarded the sufficiency for this activity as moderate. Additionally, the statement from the assistant school head showed that the school had sufficient water for all the activities where it is required

"in my life at this school I have not experienced water shortage for drinking, personal hygiene even when supervising school cleanliness students do not usually come complaining that there is no water for mopping classes or cleaning toilets"

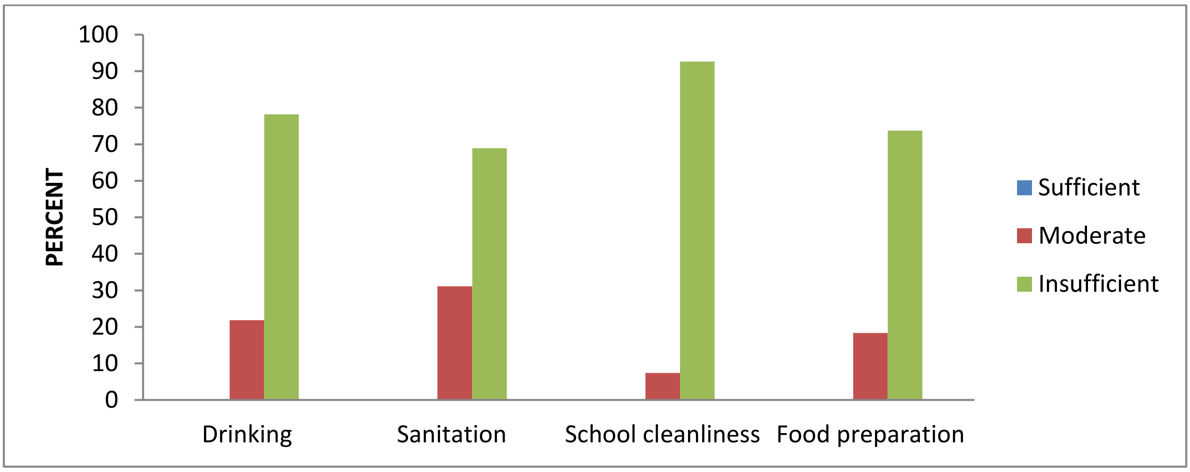


Figure 4: **Water sufficiency for various uses at School A**

Water seems to be less sufficient in School A primary school for all the activities. This is evidenced in figure 4, where there are consistent higher percentages of respondents who rated "insufficient" in each of the activities. The insufficiency is particularly pronounced for school cleanliness where 92.6% of the respondents regard the available amount of water provided to the school is insufficient for school cleanliness. The head of school further added that they have to highly control usage of the water gained this further indicates sufficient water may not be provided.

"Regardless of what we want to do with the water be it school cleanliness, drinking we have to struggle to get it and when we do, we have to over limit the usage because it does not meet our requirements"

International Journal of Education and Social Science Research

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

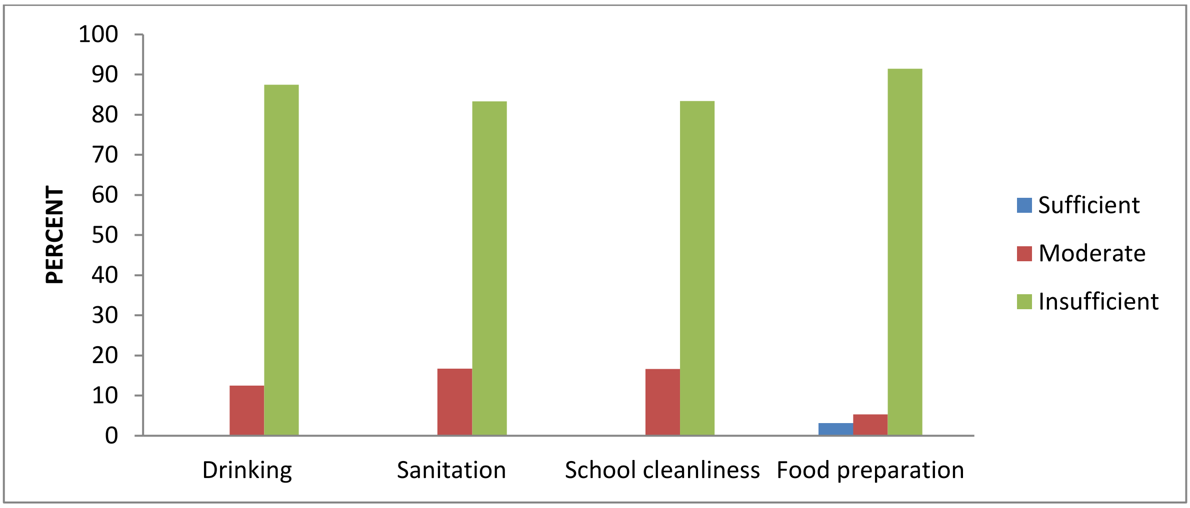


Figure 5: Water sufficiency for various uses at School D

Majority of respondents from School D primary school regarded the provided amount of water as insufficient for the inquired activities. Few respondents rated the sufficiency as moderate for all activities with proportions between 5.3% for food preparation and 16.7% sanitation for and only 3.2% regarded the amount of water provided daily as sufficient for food preparation activity. The ratings by respondents of water being insufficient for various activities had proportions ranging from 83.3% for sanitation to 91.5% for food preparation. The insufficiency was also noticed on the school head's interview response indicated below where the water obtained is sometimes not even enough to clean toilets.

"We do not get water from a nearby source and students cannot be sent there now and then and we do not have storage facilities that can store enough water to serve the school population so the water we obtain is sometimes consumed while some toilets are not yet cleaned"

Quality of the water available at the schools

International Journal of Education and Social Science Research

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

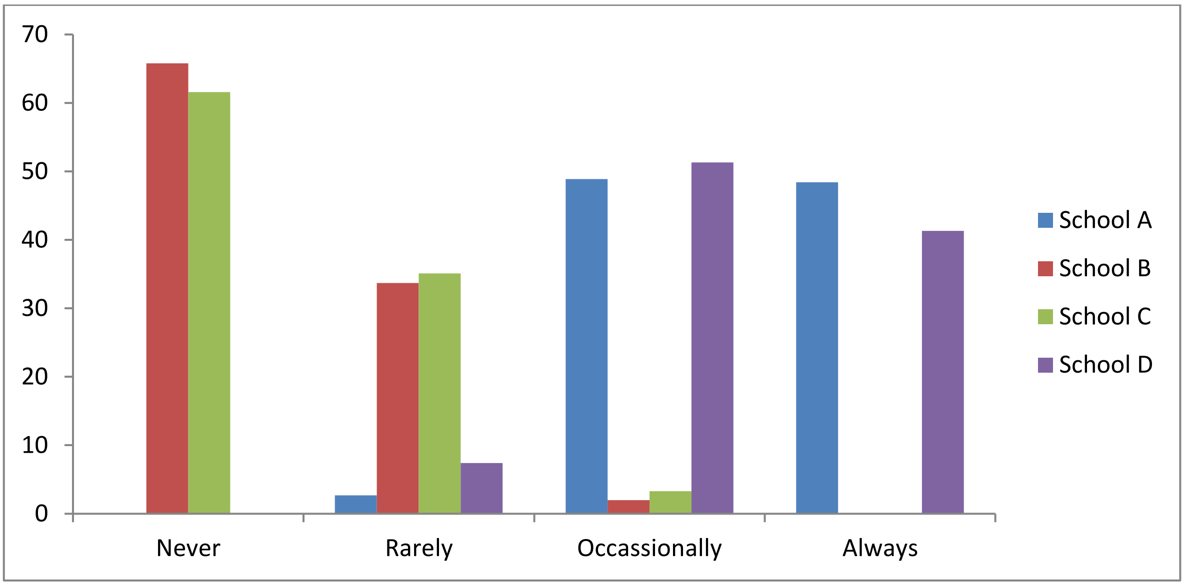


Figure 6: Frequency of noticing unusual smell, taste or color in the water used at school

As indicated in figure 7, a greater proportion of respondents from School B and School C reported never and rarely noticing unusual smells, color or taste from the water provided in school. A small proportion of respondents from these schools reported occasional noticing of abnormalities in water, which was 2% and 3.3% for School c and School B respectively. With regards to School D and School A most respondents reported occasionally and always noticing such abnormalities in the water provided ta school with only 2.7% and 7.4% of respondents these schools claimed to rarely notice such abnormalities. The heads of all the four schools were also asked to comment on the suitability of the water for human consumption. The school head of School A commented that generally the water they get is not clean but they have to use it anyway

"The water we obtain is not clean but we have to use it like that because we do not have any other way of accessing clean water"

The headmaster of School D stated the water they are able to access generally unclean but some students usually resort to drink it anyway due to thirst.

"The water we get is not safe for human consumption but when students get thirsty, they drink it anyway especially those who are of Barbaig and Ma'ngati the pastoralistic tribes"

Also, observation of the source from which School D primary school gets its water clearly validated the information given by teachers. As shown in photograph 4 the water clearly not clean.

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

Photograph 4: A swamp from which students of School D collect water

Contrasting the aforementioned schools the teachers of School C consider the water in the school as clean and of good quality. One of the teachers stated that

"Scientist say quality water should be free from germs which cannot be seen by our naked eyes well that is true but for me I would confidently say that the borehole water in my school is clean from the looks of it"

The water utilized in School c as shown in photograph 5 appears to be much cleaner compared to the swamp water collected for use in School D primary school.

Photograph 5: Appearance of the water utilized by at School C.

DISCUSSION

This study investigated the water accessibility by distance, infrastructure condition, sufficiency of water for various activities, satisfaction with water availability, and perceptions on water quality for human consumption in four schools: School A, School D, School c, and School B. The findings revealed disparities in water access, satisfaction, sufficiency and quality among these schools. In both School A and School D, the water infrastructure is either non-functional or entirely unavailable. Students in these schools must travel more than a kilometer outside the school premises to fetch water. This long-distance journey may impact their daily activities by causing tiredness, fatigue and waste valuable time that could be invested in academics (Ocheri et al., 2016). The satisfaction levels regarding water availability in these schools are notably low. School members consistently report dissatisfaction with the availability of water. Additionally, the sufficiency of water for drinking, food preparation, sanitation, and overall school cleanliness is rated as insufficient by those within the school community. Furthermore, the water available to them may not be clean and safe for human consumption since there are frequent and occasional detections of unusual color, smell and taste which may further contribute to their dissatisfaction and concern for their health and well-being. Illnesses such as diarrhea have been reported to affect schoolchildren due to usage of such water thus compromising their learning capacity (Culang et al., 2021; Rheingans et al., 2013). These findings highlight a severe issue with water access and quality that may need urgent attention to ensure the health and productivity of students and staff. The unsatisfactory water situation in these schools has been reported by other studies from developing countries including Kenya, India, Swaziland and Philippines where dropouts, absenteeism and malnutrition have been identified as the consequences (Dlamini, 2017; Sangalang et al., 2022; Mcmichael, 2019). Therefore, this seems to be a common problem in schools of developing countries. Also, it has been reported that the government is normally less likely to pay attention to the development of social services in remote areas (Jimenez, 2013), all schools studied were from rural areas though School B and School c are located at a village center in contrast to School A and School D which are more remote. Therefore, the worse water situation might also arise from the insensibility of the government to pay attention to developing social services of the area where these schools are located.

School B and School c schools had a satisfactory water situation. The schools reported moderate to sufficient levels of water availability for various activities including drinking, food prepraration, sanitation and school cleanliness. There are no reports of insufficient water from the school members. While the water infrastructures in these schools are functional, they might still require improvements. However, the current state of these infrastructures adequately meets the needs of the schools. The satisfaction levels in School B and School c regarding water availability are higher compared to School A and School D. The functional infrastructure in these schools ensures a steady supply of water for drinking, cooking, sanitation, and cleanliness. Additionally, the water in School B and School c may be considered as clean and safe for human consumption as they rarely or never at all detect unusual taste, smell and color in the water, which might enhance the overall satisfaction and well-being of the school members. According to Jasper et al., (2012) such water situation may contribute to a healthier and more conducive learning environment which facilitates maximum academic engagement and performance. The contrast between the schools emphasizes the need for improvements in water infrastructure and quality in School A and School D. Addressing these disparities may be essential to ensure that all students and staff have access to sufficient and safe water supplies, thereby enhancing their overall satisfaction and well-being. The functional yet improvable infrastructure and water quality as informed by the school members in School B and School c provide a benchmark for the necessary standards and improvements needed in the other schools.

CONCLUSION

This study found significant differences in water access and quality among four schools. School A and School D have poor water infrastructure, leading to long distances to fetch water, low satisfaction, and health issues, which impact students' academic performance. In contrast, School B and School c have functional water systems, sufficient supply, and higher satisfaction, contributing to a better learning environment. The findings highlight the need for urgent improvements in water infrastructure and quality in School A and School D to ensure all students have equal opportunities for health and education, similar to those in School B and School c. Addressing these disparities can enhance overall student well-being and academic success.

RECOMMENDATIONS

Based on the results of this study, the following recommendations are proposed to address the disparities in water accessibility and availability in primary schools in Mvomero. These recommendations are addressed to various stakeholders including local government authorities, school administrators, policymakers, and non-governmental organizations (NGOs).

1. Given the significant impact of lacking nearby water sources on students' daily routines and academic performance, it is essential to invest in the development and maintenance of water infrastructure in schools facing severe water scarcity, such as School A and School D.
2. While schools like School c and School B are relatively better off, they still require improvements in their water storage facilities to ensure consistent water availability; thus, providing well-established water storage facilities in all schools, prioritizing those with inadequate or non-existent facilities, is crucial.
3. Ensuring the sustainability and functionality of water facilities necessitates regular inspections, a practice observed in schools with better water accessibility. Therefore, implementing regular inspections and maintenance schedules for water infrastructure in all schools is recommended.
4. Adequate budget allocations for water maintenance are essential for sustaining water access, as the study indicates none of the surveyed schools had sufficient budgets. Thus, allocating specific and sufficient budgets for the maintenance of water infrastructure in schools is necessary.
5. External support can provide the necessary resources and expertise to address water accessibility challenges effectively; hence, seeking partnerships with NGOs and international

International Journal of Education and Social Science Research

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

organizations to support water infrastructure projects and educational programs is highly recommended.

REFERENCES

Ahmed, J., Wong, L. P., Chua, Y. P., Hydrie, M. Z. I., & Channa, N. (2022). Drinking Water Sanitation and Hygiene in Primary schools of Pakistan: Impact of wash-related interventions and policy on schoolchildren performance. Environmental Science and Pollution Research, 29(1), 1259-1277

Culang, C. E. (2021). The Implementation of Water, Sanitation, and Hygiene (Wash) in Schools of Zone 1 Division of Zambales. *Sch J Arts Humanit Soc Sci*, *6*, 250-259.

Dlamini, N. M. (2017). *Investigating the influence of water scarcity on the wellbeing of some primary school learners in the Lubombo region of Swaziland* (Doctoral dissertation).

Dreibelbis, R., Freeman, M. C., Greene, L. E., Saboori, S., & Rheingans, R. (2014). The impact of school water, sanitation, and hygiene interventions on the health of younger siblings of pupils: a cluster-randomized trial in Kenya. *American journal of public health*, *104*(1), e91-e97.

García, L., Santos, M., & Rodrigues, P. (2022). Water accessibility challenges in Brazilian slums: Implications for student well-being and academic performance. *Urban Education Review*, 27(2), 210-225.

Gebremariam, T., Desta, A., & Tekle, G. (2021). The impact of water scarcity on students' sense of belonging in East African schools. *African Journal of Educational Research*, 15(4), 345-360.

Jasper, C., Le, T. T., & Bartram, J. (2012). Water and sanitation in schools: a systematic review of the health and educational outcomes. *International journal of environmental research and public health*, *9*(8), 2772-2787.

Kamau, J., & Mwenda, K. (2020). Water scarcity and its gendered impact on educational participation in Tanzania. Tanzanian Journal of Gender Studies, 8(1), 33-47.

Khan, M., Akram, M., & Shah, S. (2020). Inadequate sanitation facilities and academic achievement in Pakistan. *Journal of Educational Development*, 14(1), 87-102.

Li, J., Wang, H., & Zhang, Y. (2019). The consequences of arsenic contamination on academic performance in rural China. Environmental Health and Education Journal, 10(2), 123-137.

Makundi, V., Chombo, R., & Sanga, A. (2023). Disparities in water access between urban and rural areas in Sub-Saharan Africa and their impact on education. *African Development Studies*, 22(1), 78-92.

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.

Moyo, D., Sibanda, N., & Ncube, M. (2019). Clean water access and academic performance in Zimbabwean schools. *Zimbabwe Journal of Health and Education*, 13(2), 195-210.

Ngomuo, A., & Msoka, A. (2018). Effects of water scarcity on women in pastoral areas: a case study of Melela Ward in Mvomero District–Morogoro, Tanzania. *Utafiti Journal*, *9*(1&2).

ISSN 2581-5148

Vol. 7, Issue.5, Sep-Oct 2024, p no. 126-141

Ochieng, A., Otieno, M., & Owino, D. (2021). Sustainable solutions for uninterrupted water access in Kenyan schools. Kenya Journal of Sustainable Development, 16(2), 205-220.

Rheingans, R. D., Saboori, S., & Freeman, M. C. A Cluster-Randomized Trial Assessing the Impact of School Water, Sanitation, And Hygiene Improvements on Pupil Enrollment and Gender Parity in Enrollment.

Sangalang, S. O. (2023). *Improving children's environmental health in Metro Manila, Philippines, through a school water, sanitation, and hygiene intervention* (Doctoral dissertation, Universitäts-und Landesbibliothek Bonn).

Wada, Y., Sivapalan, M., & Fung, C. (2021). Socio-economic inequities and educational prospects in Sub-Saharan Africa: The role of water access. Journal of African Studies, 25(4), 400-415.