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Exploring Causes and Effects of Water Shortage in Flagstaff Schools, Eastern Cape Province, South Africa

Myeni H [a], Msezane SB[b]*

[a,b] *University of South Africa, Department of Science and Technology Education, S. Africa*

Abstract

This article aimed to determine the causes and effects of water shortages in the Flagstaff area of the Eastern Cape Province, as well as its educational impact. This article sketches the experiences of learners and teachers who have been exposed to water shortages in schools. The research study employs a qualitative research paradigm to provide an in-depth understanding of the schooling context. The study uses social constructivism theory to examine the knowledge and understandings of the reasons of water shortages in Flagstaff schools, as well as their pedagogical implications. Four types of data collection methods were used include interviews, document analysis, observation, and audio-visual. Findings suggest that the consequences of water shortages at school level are numerous like water-borne diseases, learners falling behind in academics when struck by preventable illnesses. These mentioned consequences have the potential in the long term, have irreversible negative effects on learners and their potential to access quality education. The long-term goal of promoting good hygiene and subsequent good health in adulthood is too farfetched as learners do not have the resources to practice good hygiene habits from a young age. The article concluded by the recommendations that are deduced from the findings. The findings provide adequate evidence that the rights of children are being violated. Structural changes at the national level must be introduced to address the inequitable distribution of resources to rural schools. Access to infrastructure at schools must be monitored by the provincial and national departments of education, to ensure that the environment is conducive to effective teaching and learning.

Keywords: Water shortage; Flagstaff schools; educational impact; rights of children

1. Introduction

Water has many useful functions that are needed in our everyday life, and it is important that the world at large need to be water wise. Water accessibility can affect the social, environmental, and economic interests in the country. Although South Africa is currently

* Corresponding author: Sikhulile Bonginkosi Msezane. ORCID ID.: https://orcid.org/0000-0002-0608-8301
E-mail address: msezasb@unisa.ac.za

under water stress, as a country we still need to go ahead and address the conservation of water to pave our way to better future. According to the United Nations Children's Fund (UNICEF) and the Word Health Organization (WHO), shortages of water could become a major obstacle to public health and development. Currently, UNICEF and the WHO estimate that 1.1. billion people lack access to water supply and 2.6. billion people lack adequate sanitation because of water shortages. The global heath burden associated with these conditions is staggering, safe drinking water, inadequate sanitation and poor hygiene.

According to the National Water Act 36 of 1998, (Gazette 2018 of 1 October 2018), The Department of Water and Sanitation in South Africa (DWS) is critical to the country's economic development and social well-being since its mission is to provide sufficient, dependable, clean water 365 days a year to support socioeconomic growth (Mothapo, 2020). However, the schools in Flagstaff area still experience water shortages. The department's legal obligation is to ensure that the country's water resources are protected, managed, utilized, developed, preserved, and controlled through regulating and supporting the delivery of adequate water supply and sanitation. This is done in compliance with water-related regulations and legislation, which are vital in protecting people's rights to enough food and water, as well as boosting the economy and alleviating poverty.

These points mentioned above are the main reasons for this study. This study conducted in the Flagstaff region, which is part of the Ingquza Hill Local Municipality in the Eastern Cape province. Schools in this area characterized as within quintile 1 schools which have challenges of basic human needs such as water and electricity. There is an infrastructure backlogs and widespread poverty and undeveloped in the place where the schools are situated (Government Gazette, 2017).

Therefore, there is a need for all stakeholders to have knowledge of the effects of water shortages in the area through environmental education/education for sustainable development. Environmental education is defined as the process by which people learn about environmental issues, solve problems, and act to help the environment (Retief, VOL 74, NO1, 2018). As a result, people have a better grasp of environmental challenges

and are more equipped to make educated and responsible decisions (Smith, 2017). Environmental education/education for sustainable development integrated into school curricula can assist learners become more aware of global water scarcity. Learners would also acquire empathy for people affected by water scarcity around the world as well as a sense of responsibility for their own water usage.

Additionally, through raising awareness of the issue of water scarcity and making it relevant to the learners. As South Africa has been facing a water scarcity crisis, which has led intense water restrictions (Ethekwini Water Management Project, 2020) as well as the initiating of Day Zero in Nelson Mandela Bay due to water level of the major dams supplying the city reached 13.5% which force the city to turn off its water supply (Department of Water and Sanitation Report, 2022). Increasing learner's awareness about water scarcity in the country as well as in their schools and in communities where they live (Flagstaff schools and surrounding areas), will play vital role. Learners will also have a greater awareness of the suffering of people affected by water scarcity while developing a sense of responsibility for their own personal water usage.

The water shortage, referred to in this study, is vital for day-to-day basic needs that include drinking, cleaning school premises, school nutrition (cooking) and sewerage system. Water, sanitation, and hygiene (WASH) services that are well-managed and are critical for preventing and protecting human health during infectious disease outbreaks, such as the current COVID-19 pandemic (WHO/UNICEF, 2020). Investing in fundamental public health infrastructure, such as water and sanitation systems, is one of the most cost-effective strategies to improve pandemic preparedness, especially in resource-constrained areas (Heller, 2020). This article reviews the causes and effects of water shortages in Flagstaff schools, as well as its educational impact.

Research Location

This research was conducted in the Republic of South Africa under the Department of Basic Education (DBE) under the O.R. Tambo District. The setting of this article was in O.R. Tambo District under the Hlwahlwazi circuit situated at Ingquza Hill Municipality in Flagstaff. The schools were chosen for convenience purposes. These schools are

Junior Secondary schools which cater for learners from grade R to grade 9 which is intermediate and senior phase. The location of these schools can be seen at Figure 1.

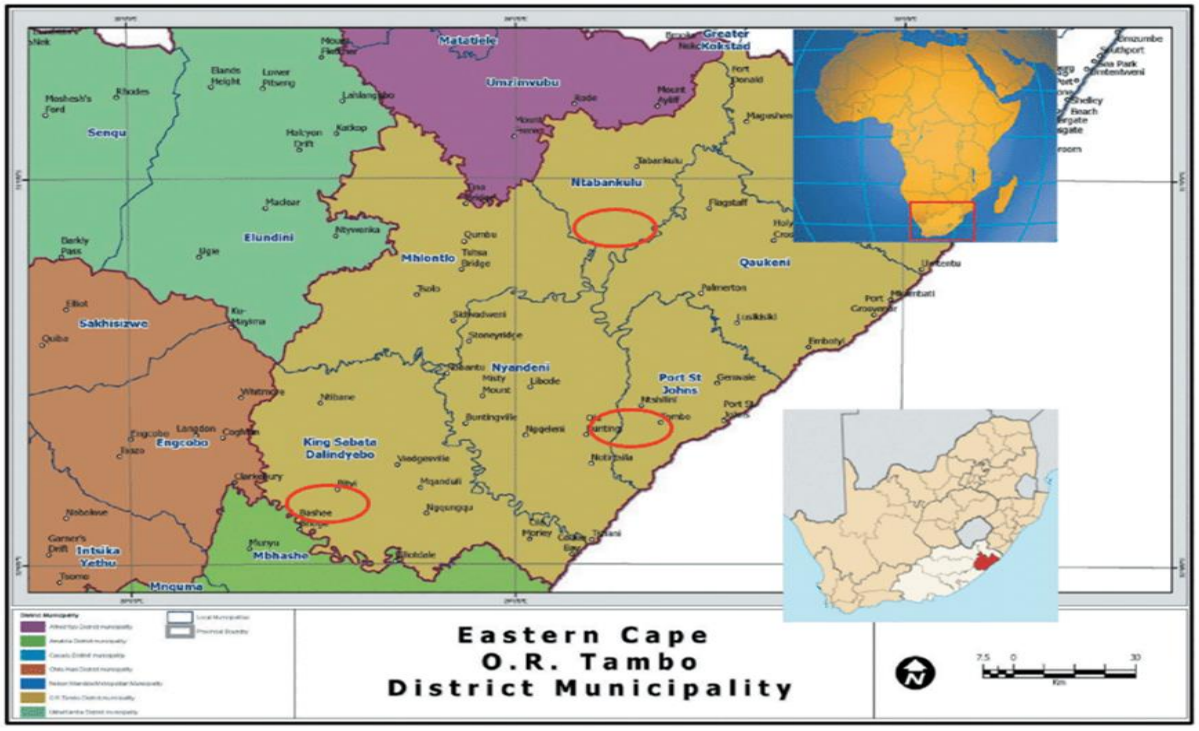

Figure 1: Map of O.R. Tambo District Municipality the location of the research.

Empirical studies

Researcher like Sense (2018) did raise the issue pertaining learner's academic performance and attendance rates decline because of a scarcity of safe drinking water in schools. Even the most determined learners can fall behind if they suffer from diseases causes by a lack of clean water such as stomach cramps and diarrhoea (World Health Organization (WHO), 2020). Learner Absenteeism Report, December (2017) added that learners also miss school to collect water or care for ailing parents or siblings, with some compelled to drop out owing to illness or care for siblings. When teachers are unwell, all ' classes are cancelled, which has a severe influence on teaching and learning. With all the additional difficulties that a lack of clean water imposes, education becomes less of a

priority. This creates an unpleasant cycle of poverty and inequality because there is little prospect of improving one's circumstances later in life without a solid education (The Water Project, 2018).

Researcher like Cosmass (2019) focus on factors which contribute to deficient performance of learners resulting from the water problem in the society causes by poor sanitation and water infrastructure. The researcher also speculated on the issues of water borne diseases in the schools and whether if there are some cases of learners missing classes because of water borne disease such cholera, typhoid and amoeba. Researcher further mentioned that the lack of water in schools allows for improper wastewater disposal, which may pose health risks to students due to sanitary difficulties. It also affects the school functioning and educational performance.

Theoretical and conceptual frameworks (2 paragraphs

The theoretical and conceptual frameworks explain the path of a research and grounds it firmly in theoretical constructs. The overall aim of the two frameworks is to make research findings more meaningful, acceptable to the theoretical construct in the research field and ensure generalizability (Imenda, 2014). These frameworks assist in stimulating research while ensuring the extension of knowledge by providing both direction and impetus to the research inquiry. They also enhance the empiricism and rigor of a researcher, both the theoretical and conceptual framework give life to the research (Grant & Osanloo, 2004). The article focused on determine the causes and effects of water shortages in the Flagstaff area of the Eastern Cape Province, as well as its educational impact. It sketches the experiences of learners and teachers who have been exposed to water shortages with rural schools, in Flagstaff, Eastern Cape, South Africa.

Stapp (2017) indicated that, The Finnish National Commission in a seminar held in 1974 stated: " Environmental Education is a way of implementing the goal of environmental protection. Environmental education is not a separate branch of science or subject of study. It should be carried out according to the principle of lifelong integral education." The article focused on teachers' and learners' knowledge about environment, integration

and environmental education. The Report of a Conference of African Educators held at Nairobi in 1968 stated that environmental education is: "To create an awareness and an understanding of the evolving social and physical environment as a whole, its natural, manmade, cultural, spiritual resource, together with the rational use and conservation of the resource for development." (Gough, 2019). Thus, this article focused on awareness to help teachers and learners to get an awareness of and sensitivity to total environment and its allied problems. And that the school curriculum should include learning areas to equip learners with knowledge, values and skills that promote the protection and conservation of the environment.

Purpose of research

The purpose of this article was to learn and explore causes and effect of water shortage in Flagstaff schools. Inadequate water supply is a development issue as well as a human rights concern. The country's health, social well-being, ecology, and economy will suffer if the government is unable to ensure an appropriate and effective water supply. The article was aimed at investigating the causes and educational effects of water shortages in Flagstaff schools to discover possible educational solutions to this problem by addressing the strategies to be implemented to alleviate the problem and to inquire on how teaching and learning is being affected by the water shortages in the schools. As the result, schools who have similar circumstances would use the findings from this article to resolve water scarcity issues in their schools.

Problem of the study

The research problem of this article was built from the human rights to safe drinking water (WHO/UNICEF, 2021) and Children's Charter. According to the South African Children's Charter published 1st of June 1992, every child has the right to attend a school that provides safe drinking water, adequate sanitation, and a clean atmosphere (Journal of African Law, 2018). It was observed that in this study area, Flagstaff, water scarcity is not affecting the schools only, but the community as well. The Flagstaff

community is dependent on rainwater collection or water catchment. This study was guided by the following research main questions and sub questions.

main question.

- What are the causes and educational effects of water shortages in Flagstaff schools, as well as their pedagogical implications?

2. Method

Research Design

A qualitative research case study design was used to add knowledge and understanding of an individual intended to collect descriptive data on participants' spoken or written words. This focused on participants utterances is one of the features that distinguish qualitative research paradigms from qualitative ones (Creswell, 2018). Simply put, within qualitative paradigm data collection techniques are used to capture both the richness and complexity of behaviours that occurs in natural setting. Once collected, data can be analysed inductively to generate findings. This enabled the researcher to get a detailed understanding about an individual or a place and to be highly involved in the actual experiences of the participants (Creswell, 2018).

Participants

Twenty-one participants included 3 teachers from intermediate and senior phase who taught English First Additional Language, Technology and Social Sciences and18 leaners both female and male (6 learners per school) participated in this study. Purposeful sampling is a sampling technique that qualitative researcher normal use (Marshall, 2018). This technique was used in this research study to recruit participants who can provide in depth and detailed information about the phenomenon under investigation. And was used because it is highly subjective and determined by this study in generating the qualifying criteria each participant must meet to be considered for the research study.

Data Collection Tools

The researcher conducted face-to-face interviews with 3 teachers during qualitative interviews. These face-to-face interviews were comprised of unstructured, often open-ended questions designed to elicit participants' ideas and opinions (Creswell, 2017). As a data collection tool, audiotaping or videotaping, as well as handwritten notes, were used. Focus group interviews was used for learners. Six leaners per school participated in the study.

Observation Form

An observation tool and audio recorder were used to collect data during lesson observation to ensure accuracy of data collected, the researcher collected field notes on individual behaviour and activities. During observations transcription was used as data observation evidence.

Validity

In this study, a multiple validity technique was employed to improve the researcher's ability to assess and persuade readers of the veracity of the findings. This included member checking to ensure the accuracy of qualitative findings, such as returning the final report or specific descriptions or themes to participants and determining whether they believe they are accurate; instead, the researcher returns parts of the polished or semi-polished product, such as the major findings, themes, or case analysis. This strategy could include doing a follow-up interview with study participants and giving them the opportunity to remark on the findings.

Credibility and Trustworthiness

In qualitative research, credibility refers to the confidence that the data and its analysis are valid and reliable (Wilson, Draper & Ives, 2008). To ensure that the study is credible and trustworthy, direct quotations from the participants were used when presenting all data collected. This was done to ensure that the findings of this research credible information that is directly from our participants through their prolonged engagement during data collection.

Data Analysis

The process of categorizing, cauterizing, and analysing data to create explanations for a specific occurrence of interest is known as qualitative analysis (Bingham & Witkowsky, 2022). As researchers progress to a more abstract level of data analysis, they constantly double-check and perfect their analysis and interpretation, and they are unable to proceed unless certain elements are present in the data so that analysis will go as expected. McMillan and Schumacher (1997) mentioned that researchers negotiate the right to return to the field if fresh data is needed or to validate emerging patterns. Guardia-Olmos (2020) added that most qualitative researchers have observed that there is no standard data analysis process for tracking analytical strategies. Making sense of the data is heavily reliant on the researcher's intellectual rigor and tolerance for preliminary interpretation until the analysis is finished (Myers, 2019). On this study, analysed data was based on four methods: observation, face-to-face and focus group interviews, documentation, and observations.

Procedures

Data Collection

Pre-interviews were conducted before lesson observations and post-interviews were conducted after the lesson observations. The interviews were conducted during school hours between 9 hours to 15 hours in the afternoon. The participants informed the researcher about their availability for interviews to avoid interrupting school activities. The face-to-face interviews were conducted for 30 minutes. The interviews were conducted in an area that was selected by the school and participants were allowed to select the appropriate environment in the school premises to conduct interviews. During observations, the researcher was non-participants observer when data was collected, and participants were aware that they are being observed. The researchers observed all the lessons that were conducted by the participants in a classroom and outdoor learning environment.

Findings

This section presented the results of the cases separately. Each case presented three themes which includes causes and effects of water shortages affecting the biophysical environment of the school, pedagogical implications of water shortages and solutions to address the issue of causes and effects of water scarcity in Flagstaff schools. only data leading to the answering of the research questions are presented and discussed.

Theme 1: Causes and effects of water shortages affecting the biophysical environment of the school.

It was very vital for the purpose of this article to look at the main reasons for not having access to running water and how the school is affected by this water shortages and the negative impact it has in the biophysical environment of the school. Teacher understands of what is causing water shortages in the school and its negative impact towards the school as she indicated on her responses. Teacher mentioned that:

> *"I think because the school is situated in rural area, where most of the community do not exercise their rights or do not know what tactic they must utilised so that the department of education together with the local municipality can work together to bring the service delivery required by the schools. And this issue of water shortages affects the teaching and learning improvement negatively because in some instants the school is forced to be closed earlier than the normal school hours due to shortages of water. And this issue is also affecting the community around the school since the school do not have proper water system as well as the community, sometimes our learners come to school with dirty uniform due to water scarcity and which is not good for their hygiene".*

According to the above statement, the teacher expresses the poor service delivery that most of the rural areas in South Africa are facing day by day and the ineffective government structures in terms of working together to serve the people of South Africa. The department's legal obligation is to ensure that the country's water resources are protected, managed, utilized, developed, preserved, and controlled through regulating and supporting the delivery of adequate water supply and

sanitation. This is done in compliance with water-related regulations and legislation, which are vital in protecting people's rights to ensure enough food and water, as well as boosting the economy and alleviating poverty. (Government Gazette, No.47558, 2022).

This was observed during the extra-curricular activities where learners have to cancel their sport activities because of the higher temperatures that needed more water so that the learners can keep themselves hydrated.

Theme 2: Pedagogical implications of water shortages.

For this paper, I also find out about consequences of poor access to water scarcity that have emerged in this study. Several impediments were raised by the participants. Those that featured prominently are discussed as sub-themes or categories which include loss of instruction time and absenteeism, curriculum achieving educational outcomes, health and hygiene, nutrition programme, sanitation, menstruation and illnesses and diseases. This statement supported by Mr Gwagwa, the schoolteacher by his response below:

> "*Inadequate access to water at home and at school is causing a ripple effect on teaching and learning. The school is not functioning well because the learners come late. Other learners come to school very dirty. Washing clothes and cleaning themselves is problematic as there is no water at home. At some stage we had to close the school for three days, the learners were dehydrated, it was in summer, and temperatures were very hot, and the school did not have water".*

Mr. Gwagwa, further alluded to the negative impact that the water scarcity has in the academic performance.

> "*The loss of instruction time seems to occur on a consistent basis where learners are sleeping in class because of dehydration and are sent home during the school day. When learners complain of excessive thirst and there is nothing the school can do, we send them home, although we know that even at home there is no water too, and those that complain about stomach aches are sent home, especially with the infants, grade R, and when we send them home, we usually ask the older learners to accompany them home which and that is detrimental to the older leaners because*

they miss some of the lessons which in return negatively affect their academic performance".

During the lesson observation it was noted that female leaners were the most negatively affected by lack of water at this school during their menstrual cycle, as they must use toilet and water frequently. Because of the water shortages, they decide to remain at home until the menstrual cycle is over. And this increases number learner absenteeism.

Theme 3: Solutions to address the issue of causes and effects of water scarcity in Flagstaff schools.

Recommendations on ways to improve access to water at school as the solution to water scarcity were both addressed by teacher and leaners. Their recommendations relate predominantly to how structured reorganisation is necessary to improve access to water at school. Learners raised recommendations for intervention for both Department of Education and the local municipality. Recommendations were also made about the role that the school can play in accessing water for the school. The following responses emerged in the proposed recommendations from the teacher:

"I think the provision of infrastructure by the government authorities to schools is priority. Specific mention was made of a budget to be set aside by government to cater for school infrastructure. A senior management member said, "Department of Education they must put aside money in the budget for providing infrastructure to the schools". whilst the schools were identified as important for development, equally important was the development of infrastructure at the community level as well".

Teacher continued with her recommendations and added the following:

"I also think that presidential intervention in infrastructure provision to schools can be a solution. And a copy of this research report could be forwarded to the government since government is concerned with the rights of children. Even the school management team should write a letter to government to remind the government that we do not have water".

Above recommendations has highlighted how serious the water scarcity is in this area, looking at teacher's suggestions of escalating the water crisis to the government. This means that they have reported this issue to the local municipality, but the problem has not been attended to. Although learners have different suggestions as they believe that local authorities can be approached, they alluded that:

> *"Local government authorities could be approached to supply water to school using water tankers. Councillors should be involved as they are influential and the part of the development in the area. They could use their influence to motivate for the pumping of purified water from the underground. And writing to the State Present saying that the school must have water and express our concern about the poor infrastructure for water which impacted other schoolmates that are in medication".*

Above statements indicate that every participant does have solutions in minds that might assist in resolving water scarcity in the school. This is supported by male learners who have their own recommendations. They point out the following recommendations:

> *"We can suggest that the school should write a letter to the Department of Education to inform them that there is no water in the school, they must bring water in. the school must also consult with the municipality and the water department that is under the Eastern Cape Province. In all, the school must consult with all the stakeholders involved".*

Looking at the above insight from participants, I agree that the situation is alarming and calls for authorities' intervention. Above comments indicates that, the school management and teachers have made several attempts to secure water through approaching the relevant authorities as they have mentioned the municipality, Department of Education and Department of Health. Their attempts were futile in eliciting any meaningful response to their plight regarding poor access to water.

Discussion

It was essential for the purpose of this article to tap into what teachers and learners understands about the environmental education in teaching and learning processes as

this outline the purpose of this article. The study provides the answers to the main research question which is: "What are the causes and educational effects of water shortages in Flagstaff schools, as well as their pedagogical implications?". In response to these research questions, the study's findings from teachers' face-to-face interviews and learners' focus group discissions revealed concrete evidence that water shortages at schools raises several challenges that impact on the functioning of the school broadly. Teachers and learners who took part in the study had been in these schools for a period of years and have experienced the effects of water shortages and its effect on the biophysical environment of a school.

In this study, it emerged that teachers and learners had experienced challenges with regards to the non-availability of water, water supply, water source, water storage as well as safe and clean water in their schools. Firstly, teachers during their interviews indicated that teachers and learners are facing with complexities of water shortages. In the findings of this study, was evident that the immediate environment of learners and teachers is fraught with difficulties in accessing water due to lack of infrastructure and unsustainable access to natural sources.

Secondly, the findings on teachers' and learners' views provide a broad spectrum of the possible ways in which the schools have try to gain access to water over the years. These methods included rainwater harvesting by means of JoJo tanks erected in schools premises, teachers transporting large quantities of water using taxis and have to pay a fare for the container as well as for themselves, hiring of water trucks to delivery water to school, teachers and learners bringing in their own daily consumption of water which is irregular and is not the case with the majority, female leaners fetching water from a nearby water source during school hours, dependence on neighbours of the school, use of the community tanks which the community takes umbrage to, some learners who have access to water both clean and poor quality water bringing it in for cooking and cleaning purposes in school and through organised transportation of water from town of which the school has to pay using school funds and through negotiations with parents and other authorities.

Consequently, I concur with the findings on teachers' and learners' views, water is an indispensable basic human need which is protected by several provision within the legislation. However, despite expensive legislation access to water is problematic for many rural schools in South Africa (Water Harvesting Centre, 2020) this include these schools in this study. This research study, sketches the experiences of teachers and learners who have been exposed to poor access to water which is against The Constitution of the Republic of South Africa Act 109 of 1996 which enshrines social and economic rights which based on democratic value of human dignity, equality and freedom which goes hand in hand with the rights encompasses the right of everyone to have access to the provision of basic necessities such as health care, sufficient food, water and security (Proudlock, 2022).

Many consequences of water shortages have emerged in this study. Several impediments were raised by both teachers and learners participated in the study. Those implications that featured prominently are include loss of teaching and learning time, learners' absenteeism, curriculum achieving outcomes, health and hygiene, nutrition programme, sanitation, menstruation, illnesses, and diseases. The study revealed that inadequate access to water at home and at school is causing a ripple effect on teaching and learning. One educator commented that the school is not functioning well because of the learners who come to school late. Teachers further mentioned that other learners come to school very dirty because washing clothes and cleaning themselves is problematic as there is no water at home. The aspect of personal hygiene due to lack of water has resulted in closing of the school before the actual school time which has the negative impact on curriculum content coverage.

Learners who come late, sleep in the class, those who are sent home and those that accompany them due to hunger or health related issues face partial loss of instruction time. The teachers work schedule is also affected as they must manage these situations affecting learners on a day-to-day basis. The school management seem to have limited options available to them under these circumstances. Sending learners home during school hours might be the only option. The difficulties with achieving the educational outcomes are intensified by lack of access to water. The above discussion on partial loss

of instruction time and absenteeism provides further motivation for this statement. Failure by teachers to achieve their educational outcomes means that learners are disadvantaged in terms of what is set down in the curriculum and that which is being achieved. This could result in a situation where the learners find difficulty in achieving the learning outcomes as set out in the curriculum. This has further impact which affects learners' education and employment opportunities.

Factors contributing to ineffective teaching and learning listed by Hunt (2009) includes that the community infrastructure background of the learner plays a major impact on the performance at school. Tshabalala (2014) is also of opinion that some leaners do not perform well because of being constantly not attending the school.

Lastly, in this study, it appeared that the natural source of water available to the schools in question, includes rivers, community tanks and rainwater harvesting. These sources provided some relief to water shortages although it available for brief period. These schools have embarked on implementing initiatives that assist conserving water they have. Each term the school organise water education and awareness initiatives where learners are educated with varies ways of water conservation they must exercise. I agree with what the schools have in place as the solutions to water constraints. The study has reveals that the schools can ably expand their water harvesting methods, like having a small safe and protected dam or safe whole in the school to stop water from flooding off a slope or technically advanced reservoir that can catch rainwater for their daily usage.

Access to safe water has been recognized as the basic human needs by World Summit held in Johannesburg in 2020. People for Rain-Water Project (2020) has of the view that, rainwater is an option, which has been adopted in many areas of the world where conventional water supply systems are not available or have failed to meet the needs and expectations of the people. Rainwater is one of a technique of water collection which has been used since antiquity (Sarker, 2021). Rainwater harvesting refers to both large and small scale. A simple affordable, technically feasible and socially accepted safe drinking water supply system in the geo-hydrological areas (rural / urban). In these schools in question, rainwater harvesting has been considered as a possible solution to water

scarcity. According to Sohag and Podder (2020) the rainwater is free from arsenic contamination, salinity and other harmful infectious organisms and pathogens.

The findings provide adequate evidence that the rights of children are being violated as social justice is concern. Poor access to water is impacting on educational outcomes. Structural changes at the national level must be introduced to address the inequitable distribution of resources to rural schools. Access to infrastructure like water and sanitation system at schools must be monitored by the provincial and national department of education to ensure that the environment is enabled foe teaching and learning to be effective. Lack of access to water and sanitation are structural barriers to education that must receive priority attention.

Recommendations

This study revealed that poor infrastructure is the main challenge associated with delivery of basic services which includes running water in rural areas and it recommended that the school can continue using the possible ways to gain access to water over the years which is rainwater harvesting while waiting for the infrastructure. This also point out the dysfunction of municipality to provide community with basic services as well as the inability of the school management to secure access to water through interaction with authorities like Departmental Head of Department of Education and the municipality has resulted in the school resorting to measures to deal with situation of poor access to water.

Recommendation for Future Research

Further research is recommended on questions such as what impact does poor infrastructure have on the health of learners and the achievement of education outcomes?

Limitations of the study

This research study was only conducted with three schools in the Eastern Cape province. This study's findings are limited to teachers and learners who took part in the study through focus groups and interviews. The choice of focus groups as one of the preferred

methods of data collection on learners may be regarded as a limitation to yielding truthful and free-flowing information even though confidentiality was ensured.

Conclusions

The findings of this study provide sufficient evidence that scarcity of water at schools raises several challenges that impact on the functioning of the school broadly. The conditions facing these rural schools in this study are intensified by shortages of water in the area where these schools are situated. This chapter draws together the main findings from which conclusions are derived and recommendations are thereby generated. Additionally, suggestions are put forth regarding areas for further research.

The aim of the study was to determine the causes and effects of water shortages in the Flagstaff area of the Eastern Cape Province, as well as its educational impact. The main objectives of the study were to explore the ideas which teachers and learners can put in place to help their schools deal with water issues and learn more about the educational implications of water constraints on biophysical environment of the schools. The discussion in this chapter is formed by the aims, objectives and sub-questions listed in chapter one.

The research study was qualitative in nature and used a case study with multiple methods of data collection. The theoretical framework for the study was approached from constructivism theory which is a synthesis of various theories that have been dispersed into one form and water management and government theory. The researcher personally undertook focus group and in-depth interviews which were analysed. Eighteen learners (both males and females), three teachers from three different schools in rural area of Flagstaff, Eastern Cape Province participated voluntarily in this study. An observation schedule was done where the researcher observed learners using water during their breaks and lunch time.

References

Bingham, A. J., & Witkowsky, P. (2022). Deductive and inductive approaches to qualitative data analysis. In C. Vanover, P. Mihas, & J. Saldaña (Eds), Analyzing and interpreting qualitative data: After the interview (pp. 133–146). Sage.

Chatzifotiou, A. (2002). An imperfect match? The structure of the National Curriculum and education for sustainable development. The Curriculum Journal, 13(3), 289-301.

Claassen, M. (2013). Integrated water resource management in South Africa. International Journal of Water Governance, 1(3-4), 323-338.

Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approach. Sage publications.

Creswell, J. W., & Poth, C. N. (2018). Qualitative inquiry and research design: Choosing among five approaches. SAGE.

Creswell, J. W., & Plano Clarke, V. L. (2018). Core mixed methods design. Designing and conducting mixed methods research, 51-99.

Creswell, J. W. (2021). A concise introduction to mixed methods research. SAGE publications.Constitution of the Republic of South Africa, Act 108 of 1996. Republic of South Africa. (RSA). Government Printers.

Cosmas, J. (2014). The interface between water scarcity and poor performance in secondary school: A case of Rombo district in Kilimanjaro [Unpublished master's dissertation]. University of Dodoma. http://hdl.handle/20.500.12661/1930

Department of Water and Sanitation (2022). Annual Report 2021/2022. Retrieved from https://www.gov.za/sites/defaul/files/gcis_document/202210/dws2021-22annualreport.pdf

Ethekwini Municipality Integrated Waste Management Plan. 2016. eThekwini Municipality. Project no. 4024-022. www.durban.gov.za/City Services/cleansing solid waste/Documents/eThekwini Municipality.

Ethekwini Municipality. (n. d.). Catchment management. http://www.durban.gov.za/ Durban/service/engineering/cscm/index

Grant, C., & Osanloo, A. (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for "house". Administrative Issues Journal: Connecting Education, Practice and Research. https://doi.org/10.5929/2014.4.2.9

Hunt, C. (2011). National strategy for higher education to 2030. Department of Education and Skills.

Imenda, S. (2014). Is there a conceptual difference between conceptual and theoretical frameworks? Journal of Social Science, 38(2), 185–219.

Journal of African Law, 2018; The interpretation and identification of international law in South African courts. South African Law Journal, 135(4), 708-736.

Karpan, I., Chernikova, N., Motuz, T., Bratanich, B., & Lysokolenko, T. (2020). Conceptual principles of education for sustainable development. European Journal of Sustainable Development, 9(2), 99-99.

Madumane, M. (2011). Investigating the challenges in school infrastructure delivery in the Eastern Cape Provincial Department of Education (Doctoral dissertation, Nelson Mandela Metropolitan University).

McMillan, J. H., & Schumacher, S. (1997). Research in education: A conceptual introduction. HarperCollins.

Mothapo, R. A. (2020). Analysis of government compliance in the provision of water and sanitation to rural communities: a case study of Lepelle Nkumpi local municipality, Limpopo province.

Mohanty, S., Bardhan, T., & Dey, A. (2020). Rain water harvesting: a viable way to combat water crisis. Food and Scientific Reports, 1(7).

Myers, D. G., & Dewall, C. N. (2019). Exploring psychology (11th ed.). Worth; Macmillan Learning.

Nong, X., Shao, D., Zhong, H., & Liang, J. (2020). Evaluation of water quality in the South-to-North Water Diversion Project of China using the water quality index (WQI) method. Water research, 178, 115781.

Parker, J. C. (2022). Method and Interpretation: Gadamer and the Limits of Methods in Qualitative Research (Doctoral dissertation, Brigham Young University).

People for Rain Project. (2020). A different path: The global water crisis and rainwater harvesting. Consilience, 12, 147–157.

Pink, R. (2012). Child rights, right to water and sanitation, and human security. Health & Hum. Rts., 14, 78.

Retief, F. (2010). The evolution of environmental assessment debates: Critical perspectives from South Africa. Journal of Environmental Assessment Policy and Management, 12(4), 375–397.

Reay, T., Zafar, A., Monteiro, P., & Glaser, V. (2019). Presenting findings from qualitative research: One size does not fit all!. In The production of managerial knowledge and organizational theory: New approaches to writing, producing and consuming theory (pp. 201-216). Emerald Publishing Limited.

Sarker, M. S. H. (2021). Regional spatial and temporal variability of rainfall, temperature over Bangladesh and Northern Bay of Bengal. Environmental Challenges, 5, 100309.

Smalls-Marshall, T. L. (2020). Kansas City Teachers' Perceptions of Reading Achievement Gap Among African American Fourth-Grade Boys: A Qualitative Descriptive Case Study (Doctoral dissertation, University of Phoenix).

Stapp, W.B. (2017). Historical setting of environmental education. In Swan, J.A., Stapp, W.B., (Eds.), Environmental Education, (pp. 42-49). SAGE.

Smith, Z. A., & Jacques, P. (2022). The environmental policy paradox. Routledge.

Şense, N. (2016). Rethinking migration in the context of precarity: The case of Turkey. Critical Sociology, 42(7/8), 975–987.

*Sohag, M. U., & Podder, A. K. (2020). Smart garbage management system for a sustainable urban life: An IoT-based application. Internet of Things, 11, 100255.

South Africa, & Juta Law (Firm). (2009). The constitution of the Republic of South Africa. Juta.

Suarez, H. (2018). The effects of The Water Project on school attendance in Rwanda. The Water Project.

Stapp, W.B. (2017). Historical setting of environmental education. In Swan, J.A., Stapp, W.B., (Eds.), Environmental Education, (pp. 42-49). SAGE.

Tshabalala, T. (2014). Comparative education. Zimbabwe Open University.

The Constitution of the Republic of South Africa. Journal of African Law, 38(1), 70–77. https://doi.org/10.1017/s0021855300011499

The National Water Act. De Rebus, 1998(371), 58-62.

Thompson, H., Stimie, C. M., Richters, E., & Perret, S. (2001). Policies, legislation and organizations related to water in South Africa, with special reference to the Olifants River basin (Vol. 18). Iwmi.

Tladi, D. (2018). The interpretation and identification of international law in South African courts. South African Law Journal, 135(4), 708-736.

UNICEF. (2007). The State of the World's Children 2008: Child Survival (Vol. 8). Unicef.

Wijesekera, N. S., Kamaladasa, M. B., Nanayakkara, M. A., & Daluwatta, D. (2020). Study on sustainable water resource management for drinking purposes. University of Moratuwa: Sri Lanka.

*Wilson, S., Draper, H., & Ives, J. (2008). Ethical issues regarding recruitment to research studies within the primary care consultation. Family Practice, 25(1), 456–461.

World Health Organization. (2002). Managing water in the home: accelerated health gains from improved water supply (No. WHO/SDE/WSH/02.07). World Health Organization.

World Health Organization (WHO) & UNICEF (2021). Coronavirus disease 2019 (COVID-19): situation report. 2021. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situationreports

World Health Organization. (2019). Programme Budget 2018–2019: Implementation and mid-term review (No. SEA/RC72/4). World Health Organization. Regional Office for South-East Asia.

WHO and UNICEF. (2021). Water-borne diseases. Retrieved from: https://www.unicef.org/mena/topics/water-borne-diseases