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The purpose of *the Oikos - The Zimbabwe Ezekiel Guti University Bulletin of Ecology, Science Technology, Agriculture and Food Systems Review and Advancement* is to provide a forum for scientific and technological solutions based on a systems approach and thinking as the bedrock of intervention.

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The Impact of Water Shortages on the Provision of Education: A Case Study of Secondary Schools in Norton Urban, Zimbabwe

ONIAS MUSANIWA, GODFREY JAKACHIRA, BERNARD CHINGWANANGWANA AND PFUURAI CHIMBUNDE[1]

Abstract

Zimbabwean urban areas have been experiencing erratic water supplies for some years, impacting negatively on the livelihoods of its people. The study sought to establish the impact of water shortages on the provision of education in Norton, Zimbabwe. Water shortages have affected Norton residents for years and the need to understand the impact of water shortages on the provision of education in secondary schools influenced the researchers to carry out this study. This qualitative case study was informed by the Sustainable Livelihoods Approach (SLA). Purposive sampling was used to come up with a sample of 15 participants, comprising learners and teachers. Data were generated through semi-structured interviews and focus group interviews which were analysed thematically. The findings of the study established that the failure by the council to supply adequate water to schools has resulted in a lack of drinking water and poor sanitation. The study further revealed learners travel long distances in search of alternative sources of water, hence a lot of valuable time is lost. It also emerged that water shortages have disrupted agricultural activities in schools despite the introduction of Agriculture as a compulsory subject.

Keywords: water, urbanity, agriculture, health, emancipation

INTRODUCTION

Water is a basic human right and access to it is very important for development. Access to water promotes human development as it is in

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line with one of the Sustainable Development Goals (SDGs), Goal 6. This goal aims to increase the effectiveness of water utilisation across all sectors and ensure a sustainable supply of fresh water to address water shortages and reduce the number of people suffering from these shortages by 2030 (United Nations, 2018). Despite this projection, there is a prevalent phenomenon that the world is experiencing an increasing water crisis affecting the well-being of millions of people. Fast-growing populations, urbanisation, agricultural expansion and climate change all contribute to greater competition and inadequacy of water resources (Abraha, Tibebu & Ephrem, 2022; Mulwa, Zhuo & Fanginou, 2021). A study by Choi, Chong, Kim & Ryu (2016) in Korea established that about four billion people, nearly two-thirds of the population of the world, face severe water scarcity and over two billion live in countries experiencing high water stress. Furthermore, Malik, Yaser, and Abubakar (2012) assert that despite the massive increase in the provision of water facilities over the past few decades, large numbers still suffer from water-related diseases including the physical, social and economic burdens associated with water scarcity. From another point of view, UNICEF and the WHO (2012) estimated that one billion people worldwide are without reliable supplies of water and over two billion lack basic sanitation. In addition, Nayar (2013) argues that, against a global investment of over $15 billion in water, 1.1 billion people are without clean drinking water, 2.6 people lack adequate sanitation and 1.8 million die yearly from water-related diseases. Thesestatistics show the gravity of the phenomenon under study.

Water scarcity limits access to safe water for drinking and for practising basic hygiene at home, in schools and healthcare facilities. When water is scarce, sewage systems fail and the threat of contracting diseases like cholera, increases (Kunguma, 2009). This water shortage is a puzzle to the urban population that depends on water supply from the municipality. Water shortages have had several negative impacts. They generally result in strict water rationing, further causing an increase in diseases such as typhoid, dysentery and cholera as people are not able to flush their toilets.

Most studies done so far have a thrust on the factors influencing water shortages in urban areas and the impact on the populace in general. A study by Gambe and Dube (2015) focused on water woes in Harare,

Zimbabwe and the implications on gender and policy. Research done by Mangizvo *et al.* (2016) explored the vulnerability and resilience in the face of water shortages in Mkoba 19 in Gweru City, Zimbabwe. Gondo, *et al.* (2020) analysed factors influencing domestic water consumption in Karoi, Zimbabwe. Another research undertaken by Museum (2021) looked at urban struggles over water scarcity in Harare. Thus the research sought to explore the impact of water shortages on the provision of education in secondary schools in Norton Urban, Zimbabwe, in light of the introduction of the competence-based curriculum. There has been little attention on the impact of water shortages on the provision of education in urban areas hence the study explores this phenomenon in the provision of education in secondary schools in Norton Urban, Zimbabwe.

THEORETICAL FRAMEWORK

The SLA improves the understanding of people's livelihoods (Serrat, 2017). It draws on the main factors that affect poor people's livelihoods and the common links between these issues. The SLA is used as a mapping instrument to improve the understanding of people's livelihoods and focuses on factors that affect human development. The SLA framework focuses on the organisational factors that inhibit or improve livelihood opportunities and demonstrates how they associate with one another. The approach does not replace other tools involved in development but makes the connection between people and the conducive environment that influences the outcomes of the livelihood strategies (*ibid*.).

The SLA identifies five types of assets, namely human, social, natural, physical and financial capital. According to Serrat (2017), human capital comprises skills, education, knowledge, competencies to work, nutrition and good health. Good health and nutrition are considered to be prerequisites for sustainable livelihoods. In the context of this study, for education to be fully implemented, learners need to have good nutrition and be in a state of good health. Furthermore, the scholar views social capital as the resources people utilise to make a living that embraces relationships that may begin within the family to the community at large, either formally or informally. The approach also identifies natural capital as one of the assets people use comprising

land, forests, waterand air, among others, in shaping livelihoods. In line with this study, this may imply that inadequate water supplies may have a negative bearing on the provision of education. Physical capital is one of the key assets in sustaining livelihoods which incorporate transport, communication, energy, shelter, waterand sanitation systems (*ibid.)*. In this study, this may mean that insufficient water and sanitary provision may affect the effective implementation of the curriculum in schools. Finally, access to financial resources has been noted as the other basic tenet of the SLA, referred to as financial capital. Sufficient financial resources boost the livelihoods of people. If these assets are fully met, there will be positive livelihood outcomes noticed with the sustainable use of resources, high incomes, good well-being, less vulnerability and food security. The opposite is true if the assets are not fully met in terms of water supply which may affect the provision of education as their health could be impacted and there could be food insecurity and high levels of vulnerability.

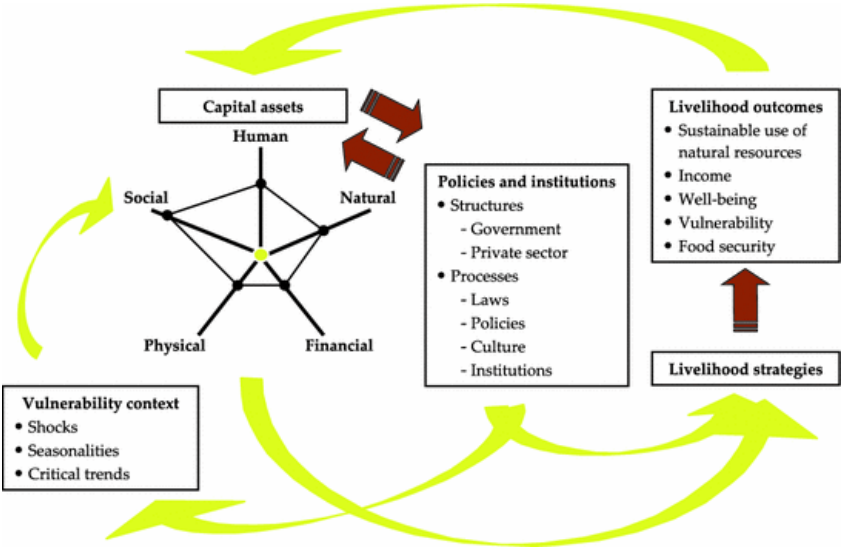

Figure 1: The sustainable livelihoods approach in diagram form; Adapted from Serrat (2017) The Sustainable Livelihoods Approach

The sustainable livelihood approach in Figure 1 shows the main components of SLA and how they are connected. It promotes people's

access to sustainable use of the resources for poverty reduction and encourages understanding of coping strategies that can be used in the community to eradicate the stresses of a certain problem. Thus, the study aims at establishing the impact of water shortages on the provision of education.

IMPORTANCE OF WATER

Dinka (2018) asserts that water is connected to every form of life on earth. This implies that water is essential for society's development and for maintaining health systems. Water sustains domestic activities such as cooking, sanitation, washing, livestock rearing, crop production and brick moulding. A study by Makwara and Tavuyanago (2012) in six urban councils in Zimbabwe indicated that water is important in promoting the Millennium Development Goal (MDG) of eradicating extreme poverty and hunger as access to water enhances agricultural productivity. Water is very essential for agricultural activities as it will enhance development in the communities. Hove and Tirimboi (2011) in their study conducted in Harare, show how important water is to human life as they pointed out that several deaths in Zimbabwe are because of water shortages in many towns. The shortage of enough clean water has led to the outbreak of communicable diseases like cholera, typhoid and diarrhoea which makes water to be a basic necessity as it reduces the outbreak of such water-borne diseases. Also, when there is enough water, they will be good health service delivery in hospitals and improved sanitation in communities.

Several factors have been linked to the shortage of water in urban centres. Some of the notable causes attributed to this phenomenon are urban population increase, financial constraints, interference in local governance and changing climatic conditions.

In a study done by Musemwa (2008) in Bulawayo, water shortages have been attributed to an increase in the urban population as people migrate from the rural provinces in search of employment. It is significant to note that as the number of people increases and incomes rise, there will be an upward trend in water demand. The United Nations (2017) established that the world's population was at 7.5 billion and was projected to add 2.3 billion more people by 2050. Water

shortages occur when water demand is higher than the capacity water of accessible in cases when there is an increase in population (Nhlanhla, 2020). This shows that water shortages are increased by rapidly growing urban areas which place pressure on water sources. The existing water purification infrastructure becomes overwhelmed with the ever-rising urban population as the demand outstrips supply. Financial challenges have contributed much to water shortages in urban centres. Most of the chemicals for the treatment of water are imported and very expensive, resulting in a huge challenge for a country facing extreme foreign currency shortages. Harare's water supply comes from Lake Chivero and it is extremely polluted with raw sewage and requires a large number of chemicals for treatment (Makwara and Tavuyanago, 2012). Due to financial constraints, urban councils have failed to refurbish old water processing plants and even expand them. Hove and Tirimboi (2011) assert that water shortages in urban areas are due to old and dilapidated infrastructure since most cities draw their water from reservoirs that were constructed way before Zimbabwe attained independence. This has resulted in the leaking of water pipes due to age and they were not renewed.

Political interference in the governance of local authorities and lack of political will have contributed to the shortage of water in towns and cities. This is supported by Makwara and Tavuyanago (2012) who state that the political situation in Zimbabwe from 2000 to the present day, has seriously affected service delivery. The study by Nhapi (2009) in Harare found that locals believed that councillors lacked the knowledge to improve the entire urban service delivery system, particularly the appalling water situation in various municipalities. Furthermore, Nhapi (*ibid.*) indicated that Harare cannot overcome its water problem under the current setting as it has failed to increase rates to economic levels owing to heavy lobbying by residents and interference by the government. Large amounts of money are allocated to the water sector, including foreign aid and are often either embezzled or completely stolen through corrupt practices (Chiremba, 2010). This reflects mismanagement by authorities, which impacts negatively critical services such as the provision of adequate safe water, worsening the plight of residents in terms of service delivery.

Changing climate conditions have culminated in severe water shortage crises of. The ever-changing climate conditions have caused water shortages that have negative effects on human health due to inadequate water supplies for drinking, farming and bathing (Abedin, *et al.*, 2019; World Health Organisation, 2009). Resultantly, people suffer from communicable diseases such as diarrhoea, dysentery and cholera due to health risks associated with climate-related water shortages. In addition, WaterAid (2012) postulates that when natural disasters such as floods, storms, cyclones, poor rainfall, sea level rise and droughts occur, it affects supply systems of water and contaminates water sources. This affects individuals as they become victims of the enduring crises of water shortages for drinking and domestic uses. Also, high temperatures and weather conditions affect the availability and distribution of rainfall, river flows and groundwater, further weakening water quality (United Nations, 2020). This implies that the frequently changing weather patterns have a negative bearing on water supplies for various household and commercial uses.

THE IMPACT OF WATER SHORTAGES

Sanitation issues range from the management of human waste from households and safe food handling before distribution. A large number of people die each year from water sanitation and hygiene-related diseases which could be reduced with access to safe water or sanitation. Lack of clean water increases the risk of diarrhoeal diseases such as cholera, typhoid, fever and dysentery and other water-borne tropical diseases (WHO, 2022; Mangizvo *et al.,* 2016). Water scarcity can also lead to diseases such as trachoma (an eye infection that can lead to blindness), plague and typhus (WHO, 2021). Water shortages in urban centres expose learners in schools to the mentioned diseases which may impact negatively the provision of education. The prevalence of water shortages has resulted in high levels of absenteeism among girls during their monthly periods, becoming a barrier to education for girls already facing huge obstacles (UNICEF, 2022). Not only limited to that but Jéquier and Constant (2010) state frequent lack of drinking water also is not healthy as it results in general body weakness. This condition, emanating from lack drinking of water, impacts on teaching and learning process. Improved water,

sanitation and hygiene practices lead to improved health for the general populace. It reduces disease, malnutrition and injury from water collection and stress.

Seasonal and chronic water scarcity is identified as a key challenge to Africa's development effort (UNESCO, 2019). The depletion of several aquifers and climatic changes are further threats to water availability and agricultural productivity (*ibid.*). In school settings, Chikoore and Bowora (2011) assert that agriculture lessons were hardest hit by the shortages as they required more water for their practical tasks to be sustainable, forcing teachers to theorise the teaching. Reliable access to water in sufficient quantities and quality for a healthy life is critical for agricultural food production, creating an enabling environment for good nutrition.

The impact of water insecurity is greatly reflected in the increased stress that people have to endure to get water during periods of scarcity. In times of water scarcity, particularly in low-income countries, women and girls often have to walk long distances to search for clean water to enable them to perform their daily household chores (UNICEF, 2021). According to UNICEF (2016), a study of 24 sub-Saharan countries established that when the collection time is more than 30 minutes, an estimated 3.36 million children and 13.54 million adult females were responsible for water collection. Furthermore, it emerged from a study done by Arku (2010) in Ghana that water sources generally were located about two to four kilometres away from the participants' homes with women and girls having to travel on foot to collect water. Burdened daily by water collection, women and girls spend large amounts of time carrying heavy vessels and walking long distances. This affects learners in schools as reinforced by UNICEF (2022) in that, time spent collecting water is time away from school, thereby denying girls a chance to build a better future. Under such circumstances, the provision of education may be compromised.

RESEARCH METHODOLOGY

The study adopted the qualitative research approach in exploring the impact of water shortages on the provision of education in secondary schools. The researchers generated data from teachers and learners

who were experiencing the impact of water shortages in the teaching and learning process. In this study, data were generated from two selected secondary schools. Therefore, the bigger the number of cases involved in a study, the larger the variation across cases and the more credible the research results are (Gustafsson, 2017) on the impact of water shortages on the provision of education. Through the adoption of the multi-case design, the researchers were able to generate in-depth data that gave a reflection of the research problem. The study population comprised five secondary schools, all secondary school teachers and learners in the Norton Urban Cluster. Non-probability purposive sampling was used to select the two secondary schools, five teachers and 10 learners.

RESULTS

SANITATION AND HEALTH CHALLENGES

The study revealed that as a result of persistent water shortages, learners in secondary schools are subjected to poor sanitation which culminated in various health challenges. The participants noted the outbreak of diseases such as typhoid, cholera and dysentery. According to the participants, this situation resulted in high levels of absenteeism among learners, impacting negatively their academic performance. It was also found that some girls miss school due to poor sanitation during their menstrual period. One of the teachers had this to say, 'The critical water shortages have affected the provision of education as sometimes there are outbreaks of communicable diseases like typhoid which greatly affect school attendance.' Furthermore, one of the learners asserted, 'With the continuous shortage of water at our school, sometimes learners are affected by dysentery and when I am experiencing my monthly period, I choose not to go to school.

In addition, one School Head stated, 'Due to the prevalent water shortages at our school, learners are exposed to poor sanitation as toilets may go for days without being cleaned exposing learners to diseases hence we sometimes send them back home early".

The views proffered by the participants indicate that the shortage of water in urban areas has a negative bearing on the effective provision

of education in secondary schools due to poor sanitary conditions that culminate in the outbreak of diseases. This concurs with the views of the WHO (2022) and Mangizvo *et al*. (2016) who point out that these shortages expose learners to diseases resulting in high levels of absenteeism. A critical analysis indicates that an inadequate supply of water in urban secondary schools has become a barrier to the effective provision of education. Good water supplies result in better health and therefore better school attendance, with positive longer-term consequences for their lives. Concerning the SLA under the physical assets, adequate supplies of water and sanitation systems have a positive impact on the livelihoods of people. Furthermore, the SLA states that good health is basic for the attainment of positive livelihoods as noted in the human capital asset. However, in the context of this study, it implies that the shortage of water and sanitary systems affects the proper provision of education as learning and teaching are always disrupted due to health hazards to which learners are exposed.

DISRUPTED AGRICULTURAL ACTIVITIES

It emerged from the study that water shortages experienced in urban areas have also affected the full implementation of the competence-based curriculum which has a thrust in agriculture. The participants revealed that the teaching and learning of agriculture have become a challenge as a result of these water shortages as learners cannot fully undertake practical activities such as gardening and poultry production. To support this view, one of the teachers asserted that, 'With the recurring water crisis, the teaching of agriculture has become more theoretical, compromising the implementation of the competence-based curriculum.' One learner lamented, 'We are no longer carrying out practical tasks in agriculture because of lack of water to sustain the activities, hence focusing much on theory.' Another teacher had this to say, 'The persistent shortage of water in urban schools has forced schools to abandon agricultural projects that are a source of revenue to supplement levies paid by parents.'

The researchers noted that with the high prevalence of water shortages in urban schools the implementation of a competence-based

curriculum has been compromised taking into consideration the fact that practical activities cannot be sustained without adequate water.

Chikoore and Bowora (2011) reinforce this by highlighting that agriculture lessons were the most affected by the shortages as they required more water for their practical tasks to be sustainable, forcing teachers to theorise the teaching. This implies that learners produced by the education system will not be fully equipped with skills in line with the expectations of hands-on experience, hence they cannot be fully self-reliant. It can be argued that the intended learning outcomes are affected by the lack of water. Under human capital, the SLA asserts that education, knowledge, skills and competencies are critical in attaining good livelihoods. This has not been fully achieved due to water shortages as the facilitators have resorted to more theorising the teaching without practical lessons in agriculture, thereby impacting the acquisition of knowledge, skills and competencies to work. The SLA also mentions high income as one of the outcomes of fully met assets. However, with the disruption of agricultural activities due to water shortages, schools have lost in terms of revenue generation, compromising the provision of education, as they will be less revenue to procure teaching and learning materials.

TIME WASTAGE IN SEARCH OF WATER

The study found that a lot of time is lost in search of water by the learners before and after school. It was revealed that this is the case because the learners walk long distances to fetch water from other sources. Resultantly, prime learning time is lost as they spend it searching for water making them lose lessons as they are late for school. Fatigue from the long search for water impacts the learners' performance as they come to school tired meaning that their concentration level will be very low. The study further established that learners absent themselves from school as they travel long distances in search of water. To substantiate this, one of the learners pointed out that, 'I get up as early as four in the morning to fetch water from wells and boreholes before going to school and sometimes I miss lessons as I return home late due to long queues.'

Another learner concurred by stating, 'I go for long distances in search of water. By the time you arrive home, you will be very tired and you always get to school late missing some subjects.' One teacher echoed that, 'With these perennial water shortages in urban schools, most learners come to school late or never attend school as time is wasted searching for water.'

These situations have compromised the provision of education to secondary school learners as they are now spending much of their precious learning time searching for water for domestic use. This is supported by UNICEF (2022) which argues that time spent fetching water is time away from school thereby denying girls a chance to build a better future. Boys are not spared either. The performance of learners has been greatly affected to such an extent that low pass rates have been attained. If there were normal water supplies, such scenarios would not occur. This implores the relevant stakeholders to play a pivotal role in addressing the challenges associated with water shortages to ensure adequate provision of education. Education has been viewed as critical in human capital in the SLA in improving the livelihoods of people. In the context of this study, the provision of education has not been well addressed as a result of the water shortages as learners absent themselves from school or arrive late after walking long distances in search of water, resulting in tiredness.

LACK OF DRINKING WATER

The study established that water shortages in urban areas have resulted in a lack of drinking water in secondary schools. With this lack of drinking water, academic performance has been affected as learners are subjected to high levels of dehydration which make them weak resulting in low concentration levels, especially when temperatures are too high. Under such circumstances, learners are not motivated to learn. One of the learners echoed, 'The supplies for drinking water are erratic so much that we are exposed to dehydration which makes us weak to pay attention in class.' A teacher from one of the selected secondary schools asserted that 'With the short supply of drinking water most of the learners show signs of poor concentration in lessons which result in low pass rates.' The responses from the participants indicate that inadequate drinking water in schools

interferes with learning to an extent that desired academic results are not attained. In health terms, a lack of adequate drinking water is not tolerated.

This is in agreement with the views proffered by Jéquier and Constant (2010) who state that insufficient drinking water results in. Due to fatigue, learners cannot focus much on learning affecting their performance in school work. In line with the informing theory under human capital, good health is a must for better livelihoods. However, in this study, it has been noted thatwater shortages have resulted in a lack of drinking water which has affected the well-being of learners and has a bearing on their learning.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the persistent water shortage in urban areas has, to a larger extent, affected the provision of education in schools. This has been noticed through poor sanitation where learners are sometimes sent back home early to guard against disease outbreaks as toilet facilities would be unusable, thereby losing precious learning time. In some instances, learners are exposed to diseases, leading to absenteeism. In addition, lack of drinking water makes learners lose concentration during lessons as they become exhausted leading to the attainment of weak passes. Furthermore, the researchers noticed that, at a point where agriculture has been introduced as a compulsory subject from primary school to tertiary level, the teaching has been more of theory as practical tasks cannot be carried out. This is due to the incessant water shortages resulting in learners failing to acquire the basic skills for self-sustenance.

RECOMMENDATIONS:

- The Ministry of Primary and Secondary Education (MoPSE) should introduce a programmep that ensures that every school has a permanent reliable source of safe and clean water to avert challenges associated with the provision of quality education.
- Schools should partner with local authorities and the corporate world to ensure that they have access to adequate safe and clean water for sanitation, drinking and sustainable

agricultural projects in line with the competence-based curriculum.

- School Development Committees should come up with initiatives that call for permanent solutions to the supply of water in schools such as the provision of high-capacity water reservoirs to facilitate effective teaching and learning.
- Non-Governmental Organisations should be engaged in the drilling of boreholes and provision of water reservoirs in schools to ensure constant supplies. This will create a friendly teaching and learning environment for the attainment of learning outcomes.
- MoPSE should constantly team up with the Ministry of Health, Child Care and Welfare in monitoring the sanitary conditions caused by the shortage of water to alleviate disease outbreaks that impact learner performance.

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