



Rainwater Harvesting as a Strategic Planning Management of COVID-19 Pandemic among Public Secondary Schools in Tanzania

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Abstract: This study explored rainwater harvesting as strategic planning management of the Covid-19 Pandemic in Secondary Schools in Tanzania. The study was carried out in Dodoma Region, Tanzania. It adopted a mixed research method by employing both quantitative and qualitative approaches under the cross-sectional research design. The study involved a sample of 66 out of 191 heads of public secondary schools, selected through simple random sampling and 14 student leaders who were purposely selected. A questionnaire was used to collect quantitative data while a semi-structured interview was used to collect qualitative data. The study established that most public secondary schools had a strategic management plan. However, only a few had a specific goal on rainwater harvest strategies as a reliable source of water during rainy seasons. Heads of schools appreciated the convivial role of rainwater harvesting for their institutions. Lack of funds and poor innovation from school management teams (SMTs) were among the main challenges for the establishment of rainwater harvesting in some schools. The study recommends that there is a need to conduct regular reviews and revisits to maintain flexible institutional strategic plans to some contemporary issues like pandemics. Second, school management teams (SMTs) should promote rainwater harvesting, which is known for being a cheap, affordable technology and an environmentally friendly water supply system. Third, the Tanzanian Government authorities, development partners and other stakeholders should support the public secondary schools to adopt the affordable rainwater-harvesting technology. Finally, educational institutions should build the capacity of their managers on strategic planning management skills for better planning and execution of their goals and for organizational wellbeing improvement.

Keywords: Covid-19 pandemic; secondary schools; strategic planning; rainwater harvesting.

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Introduction

Water resource scarcity is associated with diverse health consequences to human beings especially in developing countries and rural communities (World Health Organization (2019). The challenge is also anticipated to increase and become even more critical during the pandemics similar to Corona Virus Disease (COVID-19) and the depletion of the available water resources due to an increased global population that does not match with the increase in water resources production (World Bank, 2020). According to the United Nations, (2012), it is anticipated that more

than 2.8 billion people will be living in either water-scarce or water-stressed regions of the world by 2025 while more than one billion people may not have access to improved water supply services and more than 2 billion people may lack access to improved sanitation. This problem may be more alarming when countries are faced with killer pandemics similar to COVID-19 when water use is excessively needed. Sub-Saharan African countries have very low water coverage despite the good sanitation and safe drinking water being fundamental for wellbeing and part of the basic human rights (UNICEF, 2015).

Challenges of access to clean and safe water for drinking, sanitation and health in Tanzania have hit both urban and rural areas, individual households and public institutions. However, as reported by the URT, (2020) and Nations International Children's Emergency Fund, [UNICEF] (2020), in 2018, schools in urban areas were more likely to have access to improved source of drinking water (84.2%) compared to those in rural areas (63.8%). According to UNICEF report, about 2 out of 10 schools in rural areas were using unimproved sources of water and about 16 per cent had no water sources. Yet, according to URT (2020), 8.2 per cent of urban schools were using unimproved sources of water and about 8 per cent did not have any source of drinking water for pupils/students. The report also indicate that the status of rain water with roof catchment in public secondary schools in Tanzania was only more than 8 per cent, where in urban schools it was only about more than 9 per cent and about more than 3 per cent in rural schools. Statistics show that the water supply situation is worse in rural schools compared to those in urban areas in Tanzania. Similarly, according to URT (2020), rainwater harvesting in rural schools is very low (3.4%) regardless of the number of pupils/students enrolled in each year.

Although Dodoma Region is Tanzania's Capital City, students in public primary and secondary schools face challenges to access clean and safe water for drinking and washing and the situation was more alarming during the COVID-19 when they needed more water as a preventive measure (URT, 2020). As reported by URT (2020), the region also scored 20.9 per cent of schools observed to have water and soap at their hand washing facilities by regions in Tanzania during the COVID-19 pandemic. Again, the URT and UNICEF's (2020) study in Tanzania indicated that secondary schools in Dodoma Region had access to clean water from basic sources by only about 42 per cent of the availability of water and soaps for hand washing whereas only about 21 per cent had hygiene services.

Achieving sufficient access to water and improved sanitation, especially during the COVID-19 for all people in the world is the current global development agenda. Goal number six of the Sustainable Global Development Goals Agenda (SDGA) of 2015 to be achieved by 2030, intends to ensure the availability and sustainable

management of water and sanitation for all people (UNDP, 2015). Water is known to be an important life ingredient and a catalyst for community development and is needed by both individual and public institutions for supporting quality life and improving the accomplishment of the daily activities (UNICEF, 2015; Mahoo, Simukanga & Kashaga, 2015). Access to clean and safe water is said to be crucial for improved sanitation and hygiene, which are important for human health and well-being and for safeguarding students and other people against COVID-19 (World Health Organization, 2019). In contrast, inadequate supply, access to clean and safe water or any condition of insufficient supply of water may lead to diverse socio-economic setbacks and distress to humankind as individuals, communities and at the national level (Mahoo, Simukanga & Kashaga, 2015). While much has been done about COVID-19 and what measures have to be undertaken to control its spread, see for example (WHO, 2020; Block, et.al (2012); OECD Secretary General. Previous literature concentrated on preventive measures without linking them with the availability of clean and safe water for the developing countries including Tanzania. This study intended to investigate the ability of public schools to implement strategic planning management for rainwater harvesting during the era of COVID-19 pandemic.

What is strategic planning management?

Strategic Planning Management (SPM) has been conceptualized as the process of determining the future of overall goals or objectives of a business, aimed to bridge the gap between where it is and where it wants to go (Adeleke, 2001). According to Bryson (1988), strategic planning can be understood as a disciplined effort to produce fundamental decisions and actions that shape and guide what an organization is, what it does and why it does it with a focus on the future. On the other hand, Schendel (2009) sees strategic planning management as part of the contemporary managerial tool kits that deal with the inevitable uncertainties in the management environment as well as useful for stimulating organizational performance. Similarly, strategic planning management can be viewed as an essential tool for evaluation and review of the organizational performance to ensure effective and efficient accomplishment of the organizational long-term objectives (Tapera,

2014). In this study, strategic planning management is understood as a managerial tool that guides the schools in achieving the organizational goals and objectives. The bottom line is that strategic planning management is geared towards ensuring the institutional sustainability frameworks and adaptability of the services for the goal achievement and survival in the time of pandemic similar to COVID-19.

Rationale for Rainwater Harvesting During COVID-19

Literally, COVID-19 reinforced the importance of access to safe and reliable water of which various stakeholders need to re-prioritize the water sector after decades of under-investment and lack of political prioritization of this important resource (World Bank, 2020; World Health Organization, 2019). Similarly, the 2014-2016 Ebola outbreak in West Africa increased the demand for safe water for prevention and treatment and also increased development partners' attention to water, sanitation and hygiene (WASH) at the household and healthcare levels both during and after the outbreak (Cooper, 2020). The author further proposed that immediate WASH responses to the COVID-19 pandemic will help to save many lives.

Rainwater harvesting is a technique of water management that aims at contributing significantly to ensure the sustainability of water availability to various individuals, communities and nations (Woldeamanuel, 2019). According to Kalkidan and Tewodros (2017), rain water harvesting can be adapted by all actions to accumulate water resources to be accessible by citizens and storing the leftover water for future consumption, especially in drought seasons or when no continuing water resources that exist and during the pandemics such as COVID-19 and cholera diseases that need abundant water supply to people. Thus, in order to ensure water supply sustainability, schools and other institutions have to seek reliable means of harvesting water rather than depending solely on the government water supplies which on average, are not sufficient. Rainwater is widely considered as one of the largest sources of domestic, aquatic and surface life water supply throughout the world (Woldeamanuel, 2019, World Bank, 2011). Some common harvesting technologies and methods include floodwater and runoff harvesting, rooftop rainwater harvesting, terraces, earth dams and

surface water well collections (Woldeamanuel, 2019). While rainwater harvesting has been formerly a popular technology for sustaining agricultural activities (Han, 2019), it is currently receiving a lot of credit as a potential alternative and as a management strategy for sustainable water supply due to the increased crisis of freshwater globally (Marwa, Lufingo, Noubactep & Machunda (2018). It is, therefore, important that educational institutions employ rainwater harvesting techniques, particularly rooftop harvesting since schools have a large number of iron sheets used to roof the buildings that may support the maximum collection of rain water.

Rainwater Harvesting Policies in Tanzania

The Tanzania National Water Policy (TNWP) of 2002 directed all actors to harvest rain water by using available rainwater harvesting technologies to ensure the availability of clean and safe water in rural areas (URT & UNICEF, 2020 & URT, 2020). The TNWP (2002) emphasized to all water stakeholders including public institutions to promote rainwater harvesting through the creation of awareness and training of various stakeholders. Studies such as that of Innocent and Levi (2017) and Msuya (2017) revealed that for better implementation of policies and other government directives, institutions must adopt the policy directives in their institutional strategic planning. According to these studies, strategic planning management is necessary in the rain water harvesting. Indeed, rain water strategies are more likely to safeguard students against COVID-19, a killer pandemic. However, devising a stable and consistent strategy and implementing it for secured functioning of the entire organization is viewed as a challenging and difficult task for any management team (Hrebiniak, 2006; Innocent & Levi, 2017). Again, poor strategic planning management result into vague results in most organizations' operations (Bovaird & Löffler, 2009; Thompson, Strickland & Gamble, 2007). According to Maganga, Edriss, and Matchaya (2012), proper strategic planning management may foster and accommodate any risks and challenges in the attainment of organizational goals and in this case, rain water harvesting strategies may safeguard learners against COVID-19.

Despite having the strategic planning management for the provision of clean and safe water, rain water harvesting in the region has not

been well achieved. For example, out of 160 planned projects for rain water harvesting in Chemba, one of the districts in Dodoma Region, only 25 (15.6%) projects have been successful and are functioning (URT, 2017b). According to URT (2017c), out of 262 water supply sources in Mpwapwa District, only 43 (16.4%) are rain water harvesting projects while in Bahi District, out of 136 water schemes, only 20 (14.7%) are rain water sources. These data clearly indicate that the achievement of rain water harvesting plan has been less attained. Nevertheless, the available data on the districts' strategic plans do not specifically set the strategies for supporting public school rain water projects regardless of the increased number of the population in these institutions.

In Tanzania, the importance of water and rainwater harvesting are guided by various policies and regulations. For instance, the National Water Policy of 1991 with its amendments of 2002 (URT, 2002) describes water as a basic natural resource for socio-economic development. The policy describes water as a fundamental resource for socio-economic development activities such as industrial production, irrigation, livestock keeping, mineral processing, hydropower production, navigation, recreation and tourism. The Tanzania Water Policy of 2002 insists on the supply of clean, safe and potable water within a 400 meters walking distance with acceptable water quality (Ref?). The policy has put much emphasis on community participation, private sector participation and integrating water supply with sanitation and hygiene education. Thus, the policy recognizes the importance of adequate water supply for improved hygienic conditions, including prevention of water borne diseases and the now COVID-19 pandemic. All public institutions within an administrative council fall under the administrative authority of the District/Municipal or City Executive Director of a particular council. In Dodoma Region, the available data indicate that each district and municipal has its strategic plans of which, water service supply is among the main objectives. Given the current COVID-19 pandemic, one would hope that schools could invest in rain water harvesting to tackle the increased demand for water supply. Short of that, the situation may threaten the survival of students.

Effects of Water Scarcity on Livelihood

Inadequate and lack of clean and safe water supply has numerous health and social consequences, especially during the COVID-19 pandemic. World Health Organization, (2019) links water scarcity with the continued deterioration of health conditions and the outbreak of diseases. For instance, nearly 90 per cent of diarrhoea is attributed to unsafe drinking water, inadequate sanitation and poor hygiene (United States' Bureau of Economic Growth, Agriculture and Trade, 2009). There are incidences related to water-borne, water-related and water-washed diseases in Mpwapwa District which indicate that people use contaminated water and only 4 % of mothers and 5 % of children wash their hands with soap after using the toilet (Hooks, 2008).

Due to all of these problems, Current studies on the COVID-19 pandemic have emphasized the need for regular hand washing as a preventive measure against transmission and protection of the pandemic. Researches on preventive care against the deadly COVID-19 pandemic have directed individuals, institutions and the general public to use clean water to wash their hands regularly (World Health Optimization, 2019; World Bank, 2020). Thus, school institutions with diverse users such as learners from different backgrounds and health conditions have to be safeguarded by the availability and reliable clean and safe water from the rain water harvesting. However, most of the public secondary schools depend on tap water from government supply systems, which is both costly and sometimes unpredictable (URT & UNICEF, 2020).

Theoretical Underpinnings

This study used the adaptive leadership theory, developed by Heifetz (1994) to assess the leadership practices among the heads of secondary schools in combating the COVID-19 pandemic through preventive care strategies of using water. Historically, the work by Heifetz paved the way for the development of a new form of leadership that promoted the adaptive capacities of people, other than addressing problems within their leadership realism and environment. Specifically, the main focus was put on the leaders' role to mobilize followers to solve difficult problems and continue to grow together as a team Heifetz, Grashow and Linsky (2009). The adaptive leadership style focuses on behaviors of leaders in organizations. As observed by

Northouse (2016), the main distinction between this theory with other leadership theories is its emphasis on behaviors of adaptive leaders. Earlier studies such as Heifetz, Grashow and Linsky (2009). Heifetz and Laurie (1997) and Heifetz and Linsky (2002) have identified three components of the adaptive leadership style. These components are: (a) the situational challenge (b) the leaders' behaviors and (c) adaptive work (innovation). Adaptive leaders act as principal guides of helping co-workers and other organizational members overcome challenges and any other organizational changes that create stresses. Similarly, Boylan and Turner (2017) uphold that a comprehensive definition of adaptive leadership is a multifaceted concept that combines both individual adaptability and organization adaptability. Individual adaptability is a mind-set and a cognitive ability applied by a leader in a given context. As observed by the author, organizational adaptability is a derivative of organizational change.

The implication is that organizational adaptability can be a planned or unplanned change; however, to foster planned organizational changes, a planned method or framework is required to modify the functioning of an organization (Kotter, 2012). According to Heifetz, Grashow and Linsky (2009), adaptive leadership requires improvisation and experimentation. As observed earlier by Tillson *et al.* (2005), adaptability leadership needs to be proactive in nature to have a safe stand during pandemics similar to COVID-10. Boylan and Turner (2017) argue that adaptive leaders are supposed to be innovative and to use creative approaches in anticipation of a response to the environmental changes appropriate to solve problems such as shortage of water in a crisis similar to the COVID-19 pandemic that has hit almost all countries in the world. Adaptive theory of leadership is likely to help the heads of schools to tackle the contemporary challenge of the COVID-19 pandemic in the future by adapting the use of strategic plans to harvest rain water.

Methodology

Research Design

The study employed a mixed research approach and a cross-section survey design. The mixed approach involved the use of both qualitative and quantitative data in a single study (Creswell, 2003). The mixed research method helps in triangulating the sources of information such that

qualitative and quantitative data complement each other (Fraenkel, Wallen & Hyun, 2012).

The Study Area

This study was carried out in Dodoma Region, Central Zone of Tanzania because despite that Dodoma Region hosts the Capital City of the country, the region experiences a semi-arid climate where rainfall is unpredictable and is non-torrential, with a long dry season. In this region, public schools have all the potential for rain water harvesting and health awareness programs. For example, the region is the hub of government activities, vocational education authorities, many higher education institutions and a referral hospital (the Benjamin Mkapa Hospital). Due to the shift of the Capital City from Dar es Salaam to Dodoma, the population has abruptly increased signifying an increased number of learners in schools that need water resources as a measure towards the battle against pandemics such as the COVID-19.

Population and Sampling

According to URT (2020b), Dodoma Region had 191 Public secondary schools by the year 2020. The study therefore involved 191 public secondary schools in the region. The sample was 66 out of 191 heads of public secondary schools, selected through simple random sampling and 14 student leaders who were purposely selected.

Data Collection Methods

This study used a questionnaire and a semi – structured interview schedule to collect data. The questionnaire was used to collect quantitative data while the semi-structured interview was used to collect qualitative data.

Statistical Treatment of Data

Analysis was carried out by transcribing the quantitative data first and then coding the qualitative information according to themes. Thereafter, quantitative data was presented in tables through frequencies and percentages while qualitative data was presented in words.

Ethical Considerations

The study maintained ethical standards throughout the study. Before actual data collection, the researcher sought a permit and it was granted by the relevant district authorities after the approval of the Dodoma Regional Administrative Secretary (RAS). During field data collection, respondents were asked for their

consent to participate. The researcher informed the study participants that they have the right to withdraw from the study at any time when they felt to do so. The study did not ask or take any names or personal identifiers during data collection to maintain the anonymity and confidentiality of the study participants. During data coding and data analysis, all questionnaires were labelled using Arabic numbers while schools were labelled using the counting numbers to maintain anonymity.

Results and Discussions

Data obtained from various research tools were analysed, presented and discussed in this section based on the three research questions.

Table 1: Perception of Heads of School on Strategic Plan in Rainwater Harvesting

SN	Statement	Agree		Disagree	
		f	%	f	%
1	We have a valid school strategic plan	52	78.7	14	21.3
2	We have a strategic plan for rain water harvesting	22	33.3	44	67.7
3	We review the school strategic plan in order to accommodate the national strategies against the Covid 19	6	9	60	91

The data also indicated that most of the schools (91%) had not incorporated the new goal against the COVID-19. Heads of schools were reluctant to implement and adapt the rain water harvesting as a strategic planning management to counter-check the effects of COVID-19. During the interview, one of the heads of schools, at school (24) said:

As a head of school management team, I believe rain water harvesting will end the crisis of water in institutions that have many students to support the fighting against COVID-19. However, it has been an oversight for not involving rain water harvesting plans in our annual strategic plans. I think, next time, we shall consider this objective to be among the main goals and activities.

On the other hand, one student during the interview from school (34) said:

The shortage of water has affected our commitment to studies. Normally, students walk a long distance to collect water from the wells for cooking, cleaning and watering the gardens during class hours. We are aware of the need for washing our hands as a good practice for

Research Question 1: What are the perceptions of Heads of Schools towards Strategic Planning Management on Rainwater Harvesting in Secondary Schools?

This study sought to establish whether the heads of schools had a strategic planning management for rainwater harvesting in their schools. The findings indicated that 52 (78.7%) of the sampled schools had school strategic plans. However, most of the plans 44 (67.7%) did not involve rain water harvesting aspect even though following the outbreak of COVID-19, adequate water supply became essential (Table 1). The schools remained with the traditional thinking of depending on unreliable sources of water.

healthy. I think, if our school establishes a rainwater harvesting project, water will be available and sustainable.

As it can be seen from the findings, it is indicated that heads of schools acknowledged the necessity of having rain water strategic plans as solution to shortage of safe and clean water in their schools as measures for fighting against COVID-19, but they did not do so. These findings negate from the findings of Boylan and Turner (2017) who found that adaptability leadership is proactive and innovative for counter-balancing unforeseeable future as we now experience the killer pandemic such as COVID-19. As heads of schools were expected to deliver the adaptive leadership to respond to environmental changes and take all necessary sufficient measures to fight against the spread of the COVID-19 pandemic in their schools, however, they did not adapt the rain water harvesting strategic plans that could safeguard the students as a preventive measures for the COVID-19 contamination. On the other hand, these findings concur with those of UNDP (2020) which revealed that nations were not taking proactive steps against the spread of the disease and its resultant socio-economic impacts that may risk the students' livelihood.

Research Question 2: What is the trend of Supply and Use of Water in Secondary Schools?

The findings indicated that the sources for water supply in most public secondary schools in Dodoma Region were unreliable. It was reported that only 22.7 per cent of the public secondary schools were satisfied with the reliability of water sources compared to 77.3 per cent of the schools which were dissatisfied (Table 2). Moreover, the findings indicate that water supply in most public secondary schools was not enough to sustain the daily requirements (N =47, 71.2%). Most of the schools were not satisfied with source of water

even during the rain seasons (N =59, 89.2). Similarly, during the interview, one of the heads of schools (School 36) said:

Despite the fact that our school is connected to tap water, the reliability of water supply is not guaranteed. Sometimes the available water does not suffice the daily requirements for the whole school community. Therefore, students and pupils do suffer as some do not attend classes due to long hours of fetching water.

Table 2: Satisfaction with Water Supply

SN	Statement	Satisfied		Not Satisfied	
		f	%	f	%
1	Satisfaction with the reliability of current water sources.	15	22.7	51	77.3
2	Water supply satisfies only daily requirements	19	28.8	47	71.2
3	Water supply satisfies our requirements for few days (3-5 days).	21	31.8	45	68.2
4	Water supply satisfies our requirements only during rain seasons.	7	10.8	59	89.2
5	Water supply does not satisfy the requirements.	19	28.8	47	71.2

Table 3: Perceived Benefits of Rainwater Harvesting in Public Institutions

SN	Statement	Agree		Disagree	
		f	%	f	%
1	Rainwater harvesting ensures the availability of water throughout the year	56	84.8	10	15.2
2	Rainwater harvesting reduces the cost of running the institution	51	77.2	14	21.2
3	Rainwater harvesting improves hygiene and sanitation as measures to control diseases	60	90.9	6	9.0
4	Rainwater harvesting enables establishment of vegetable gardens	63	95.5	3	4.5
5	Rainwater harvesting saves time for collecting water	54	81.8	12	18.2
	Rainwater harvesting provides clean water for drinking water	64	97.0	2	3

These findings indicate that public schools did not have enough water for the basic requirements. This situation raises some questions on how the school community has been managing to implement national and general health directives on protective measures against COVID-19 through regular hand washing practices as scientifically recommended (WHO, 2019; Cooper 2020). The findings confirm the existence of the critical challenge of unreliable supply and access to water in rural areas in Tanzania. This is also supported by the African Development Bank Group (ADB, 2010) which asserted that one out of two rural Tanzanians does not have access to improved water supply and sanitation. Similarly, the average water supply service in 2017 was only 32 per cent in rural areas (URT, 2017b). With this scenario of water scarcity countrywide, heads of schools need to re-think of investing in locally workable means of producing water supply resources to protect

their large populations against the effects of COVID-19.

Research Question 3: What are the Perceptions of heads of school on rainwater harvesting?

When asked to list down ways in which rain water harvesting was or would be beneficial to their institutions, the following responses were given as indicated in Table 3. The table shows that 97 per cent of the respondents perceived that rain water harvesting was beneficial to their institutions by providing clean water for drinking.

Respondents reported that rain water would make their schools establish vegetable gardens (N = 63, 95.5%). Rain reduced the cost of running the institutions (N = 51, 77.2%). Moreover, rainwater harvesting was perceived as the amicable solution for saving times used to collect water during class sessions (N =54, 81.8%). Lastly, respondents had a

view that rainwater harvesting improved hygiene and sanitation in schools (N = 60, 90.9%).

Research Question 4: What are key challenges towards establishment of rainwater harvesting in public secondary schools?

The qualitative data collected through semi-structured interviews revealed that inadequate funds and lack of innovative leadership were the main challenges towards rainwater harvesting in most public secondary schools. It was reported that insufficient financial resources was among the main reasons for the failure to install rainwater-harvesting infrastructure in some institutions. During the interview, one of the head of school (12) said:

The school budget does not have any slot or funds for rain water harvesting. By the way, the government funds that we receive are specific to cover some costs per individual pupil. We do not have any internal sources of funds. Communities no longer support schools financially through contribution and they believe that the government has forbidden these contributions from the parents and community members.

The scarcity of funds may be due to poor planning. These findings are in line with that of Sumra and Katabaro (2014) who established that lack of financial capacity to most of the educational institutions as a big challenge which undermined the suitable environment for quality education provision. Rainwater harvesting is reported to provide fresh water for drinking, for laboratory use in schools and for sterilizing medical equipment. Given these diverse benefits, studies consider the reliability of rain water to be of great priority and as a sustainable alternative for water supply as well as for integrated development (Mohamed, 2018; Marwa, Lufingo, Noubactep & Machunda, 2018).

Moreover, it was found that some of the institutions that did not have rain water harvesting facilities had the opportunities to use normal corrugated iron sheets and local carpenters to get some water for students. Despite the intensity and fatality of COVID-19, some heads of school were noted not to bother or become curious and innovative over rain water harvesting by using the available cheap

technology. During the semi-structured interview, one student-leader from school five (5) said:

Our school has four buildings which are roofed with iron sheets. Every building has length of about 50 meters long and 25m width or more. If the school management was able to harvest the rainwater in the four buildings just for three rain days, I think the school could have enough water for domestic and environmental cleanness. It is possible even to use the locally available iron sheets and fold them accordingly to harvest rainwater during the rain seasons.

The above quote indicates that rainwater harvesting requires innovative leaders with adaptive skills and flexible in improvisation. The qualitative data from the verbatim quotes may be a consequence related to insufficient plans at district level regarding rain water-harvesting projects. These findings correlate with Hrebiniak (2006) who asserted that strategic planning management is practically a big challenge to management teams where formulation and execution of stable and consistent strategies remain a difficult.

Conclusions and Recommendations

Conclusions

Most of public secondary schools had a strategic management plan. However, only few had a specific goal on rainwater harvest strategies as a reliable source of water during rain seasons.

Heads of schools appreciated the convivial role of rainwater harvesting for their institutions. They perceived that rainwater harvesting will end the challenges of water scarcity in most public schools.

Lack of funds and poor innovation from school management teams (SMTs) were among the main challenges for establishment of rainwater harvesting in some schools. This is against the fact that educationists should nurture the path towards improvisation and innovations.

While water remains as the essential basic human needs in public secondary schools, the supply and use of water in public secondary schools is unreliable. Life without reliable supply of water in schools is lifeless.

Recommendations

The study recommends that there is a need to conduct regular reviews and revisits in order to

maintain flexible institutional strategic plans so as to some contemporary issues like pandemics. Furthermore, there is a need for regular assessment and monitoring of strategic plans for better execution of various objectives to meet the intended goals.

Second, school management teams (SMTs) should promote rainwater harvesting, which is known for being a cheap, affordable technology and an environmental friendly water supply system. Adoption of appropriate rainwater harvesting technology will guarantee the provision of quality education.

Third, the Tanzanian Government authorities, development partners and other stakeholders should support the public secondary schools to adapt the affordable rain water-harvesting technology. The central government should design an educational funds collected through rainwater harvesting basket funds in districts and regional levels for establishing rainwater harvesting infrastructures.

Finally, educational institutions should build the capacity of their managers on strategic planning management skills for better planning and execution of their goals and for organizational wellbeing improvement.

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