



Effects of Disaster Management towards Academic Achievement in Public Secondary Schools in Arusha District

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Abstract: *This study investigated the effects of disaster management towards academic achievement in public secondary schools in Arusha District Council, Tanzania. Objectives were to; examine ways of managing disasters in secondary schools and effects of disaster management towards academic achievement of students in public secondary schools. Emergency Management Theory guided the study. Convergent mixed methods design was adopted. Questionnaires, documentary analysis, photo taking and interviews were used to collect data from 105 students and 85 teachers selected by simple and stratified random sampling techniques. Five school heads and 4 WEOs were purposively selected. Validity was fortified through expert inputs. Reliability employed test-retest technique and reliability index, $SQ r=0.735$, $TQ r=0.827$ and $NTSQ r=0.761$ were obtained. Credibility and dependability of qualitative data was established through detailed reporting of the research process. Qualitative data underwent thematic analysis. Quantitative data were analysed using descriptive statistics in the SPSS version 23 and results were presented in tables. Findings include provision of fire extinguishers to help in putting off fire outbreaks, enhancing drainage system and raising building foundation to prevent surface runoff from accessing classrooms and offices. Proper use of fire extinguishers to minimize damages caused by fire in schools hence minimal interference to learning process. In conclusion, without a disaster management plan, schools spend more time and resources reacting to a situation instead of planning for the anticipated disaster. Recommendations entailed all institutions to provide fire extinguishers, enhance drainage system and improve students' discipline as disaster mitigation measures.*

Keywords: *Disaster, Management, Academic, Students, Arusha*

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1. Introduction

Disaster management, also known as crisis management, is a methodical process to safeguard the lives and property of people from unforeseen natural and man-made crises. Disaster management is used at disaster

times by providing the necessities to humans and saving the lives while fighting against the conditions and situations. If left unchecked, disaster has the potential of negatively affecting the academic achievement of students in public secondary schools. For instance, according to Nasimiyu et al., (2020), the countries such as Japan, New Zealand, Indonesia, Philippines, and Australia are the

major countries faced by disasters such as fire incidents affecting schools and are caused by natural calamities; earthquake, tsunami and volcanic eruptions. That is why students and teachers participate in direct instruction on how to prepare and handle the effects of such disasters. Mutch (2018) noted that the instructions given on how to prepare for disasters include the management of resources and responsibilities which help in reducing the impact of the disaster on the people and assets. The plan of action of disaster management will be effective and simple efforts to reduce the effects caused by the natural disaster to a low level. Nature can take the damage done by humans to it but vice versa will be impacted directly on the lives of living beings as nature will be aggressive sometimes in the environment with natural calamities or disasters.

Petal and Izadkhah (2018) assert that disaster incidents can be mitigated through routine drills, inclusion of disaster issues in the school curriculum and training. However, these practices require embedding in the national policies the contextual issues in schools for successful implementation. In Sub-Saharan Africa, such as Sudan, Chad and Uganda, flood impacts are felt across various sectors of the economy, including education, agriculture, livestock, transport, housing, public health Industrial processing and tourism (Dida 2018). Disasters affect not only individuals, but also the social life in the communities as well as the whole country. This has a direct bearing on academic achievement of students.

Similarly, fire disasters in Tanzania's secondary schools are alarming. Between 1994 and 2017, more than twenty secondary schools were gutted resulting in deaths and injuries to students, as well as the demolition of the school facilities and infrastructures (Bushesha and Ndibalema, 2017; ITV, 2016; Majira, 2015; Mwananchi, 2016; RFA Tanzania, 2017; Uhuru, 2016). The recurrence and side-effects of fire disasters in secondary schools, call for international and national governments to initiate policies for managing safety in schools. In Tanzania, the Ministry of Education, Science and Technology (MoEST) issued policy directives for managing fire outbreaks in schools, with a focus on secondary schools and Teacher Training Colleges (WEMU, 2011). Despite the policy guidelines being issued, the problem has persisted over the years. This reveals a gap between policy intentions and ground practices. It is in this regard that the current study sought to investigate the effects of disaster management towards academic achievement of students in public secondary schools in Arusha District.

1.1 Research Questions

The following research questions guided the study:

1. What are the possible ways to manage disasters in secondary schools?
2. How does the management of fire outbreak, floods, criminal acts and hunger affect the achievement of students in secondary schools in Arusha district?

2. Literature Review

The theory reviewed that guided the study was Emergency Management Theory (Klenow, 2008).

2.1 Emergency Management Theory

The theory postulates that emergency management is a process which is undertaken by a person or their staff representing dozens of agencies or organizations. This process functions as a full life cycle of any disaster which includes recovery, response, mitigation, and preparedness. While responding to disasters, people think first responders; police, fire extinguishers and emergency medical officers because these are the people to provide us facilities to escape sudden disasters (Klenow, 2008). In the phase of operation, there is possibility of another emergency such as accidents that could have occurred. In other words, an emergency can lead to another emergency. So, this was the reason for the development of this theory (Hodges, 2008).

2.1.1 Application of the Theory to the Current Study

This theory gives the new ways and methodologies that can be used for the prevention of disasters and emergencies to take place. It also guides that information and knowledge should be given in advance so that the emergencies can be avoided and if they take place then they should be mitigated. The theory emphasizes a strong relationship between environment, culture, and disasters. The culture and environment are very much closely related and the integration of environment and culture generates different types of disasters. For instance, the environment where there is no teamwork and continuous repair, or maintenance of infrastructure is an indicator for disaster in waiting. Consequently, the theory postulates that early signs of disasters should be managed.

2.2 Empirical Review

The researcher reviewed empirical studies under the following study objectives: to examine the ways of managing disasters in public secondary schools and to investigate how the disaster management (fire outbreak, floods, criminal acts and hunger) affects academic

achievement of students in public secondary schools in Arusha district.

2.2.1 Ways of Managing Disasters in Public Secondary Schools

The study conducted by Cross-field and Bourne (2018) in Jamaica on the management of disaster suggested that children and adolescents, even outside of school settings, are particularly at risk in disaster moments. Consequently, individual countries should choose the form of disaster management cycle which is most appropriate to their needs and put the interest of children first. For instance, Kotter (2012) noted that choice of training programmes for disaster management should concentrate mainly on the various aspects of preparedness, response, and recovery. Use of the disaster management cycle helps facilitate understanding of not only the important relationship between these three vital aspects but also their connection with other disaster-related activities.

In addition, Kelly (2020) in a study in Canada found that disaster management involves accurate risk assessment; effective monitoring and warning systems, including remote sensing to define “curing” or drying out of vegetation; fire prevention regulations; seasonal mitigation measures (example, fuel reduction); building regulations; and public awareness and education programs, especially to ensure that individuals, families, and communities cooperate in applying measures for prevention and mitigation, especially that they maintain adequate standards of preparedness during the high-risk season.

Following regular incidents of fire in schools, Kenyan government issued emergency preparedness guidelines for managing the problem (Nasimiyu et al., 2017). The guidelines on fire disaster management are intended to create awareness among school members and the larger community to mitigate fire outbreaks. The Ministry of Education (MoE) of Kenya, in this regard, also insisted on education managers to inculcate the culture of safety to manage fire outbreaks in schools, particularly in secondary schools (Shibutse et al., 2014).

Results from the study by Amuli (2019) in Tanzania show that the stakeholders at the lower levels of the MoEST were hardly involved during the policy formulation process to manage fire disasters. In fact, even documents to guide and direct school on effective management of fire disasters did not reach implementers in secondary schools because of unreliable channels of communication from the ministry headquarters downwards.

2.2.2 The Effects of Disaster Management on Academic Achievement of Students in Public Secondary Schools

A study by Matenga (2015), when tracing the history of disasters in California schools, found out that generally, disasters cause disruption to essential services, damage to national infrastructure such as schools and disruption to governmental systems such as education, thereby negatively affecting students’ academic achievement in public secondary schools. The study conducted using questionnaire in one of the districts in Zimbabwe by Nyamajiwa (2016) reveals that competition over resources particularly after disasters is one of the causes of weak academic achievement among students.

In a related study by Valente and Lourenco (2020) on effects of disaster management towards academic achievement of students, the study found that proper disaster management inspire confidence among students, minimizes panic and enhances academic activities of to students. A study by Bakala (2020) on disaster management practices in secondary schools in Linnu Woreda in Addis Ababa concluded that there is need to establish Disaster Management Plan which should be a guide to the relevant role players. It shall guide the role players on how to lead in case of a disaster to prevent or at least mitigate negative effects on the students and faculty. The plan will be the basis to establish procedures which will assure maximum and efficient utilization of all resources in and around the school, minimize the loss of life or injury.

The study by Ntide (2015) also revealed that in most schools, disasters are caused by lack of proper communication, preparedness as well as lack of training. However, since disasters occur periodically in life, intervening measures such as training, having emergency doors or windows and surplus of both human and material resources are necessary for continued education in schools. A study by Mutch (2018) on disasters management in secondary schools in Tanzania revealed that in case of disaster, it is important to assess the damage and report information to police. Therefore, it is necessary to include disaster awareness aspects in school programmes.

3. Methodology

Convergent mixed methods design suitable to collect data through questionnaires, documentary analysis, photo taking and interview guide was adopted. The design allowed the researcher to collect both qualitative and quantitative data and analyze them separately (Creswell and Creswell, 2018). The quantitative and qualitative

results were later integrated. The population target was 2193 respondents from 35 public secondary schools comprising of {35 school heads, 850 teachers, 231 Non-Teaching Staff (NTS), 27 ward Education Officers (WEO) and 1050 form four students}. The sample size consisted of 249 respondents; 105(10% of 1050) students and 85 (10% of 850) teachers selected by simple and stratified random sampling techniques. While 50 (21.6% of 231) NTS, 5(15% of 35) school heads and 4 (14% of 27) WEOs were purposively sampled. From each school, 21(11 girls and 10 boys) students and 17(9 female and 8 male) teachers were selected based on their gender. Consequently, this implies that the information obtained from these results from the respondents on their knowledge on the ways of managing disasters and how disaster management affects academic achievement of students in public secondary schools can easily be generalized. The location and respondents were selected because it was anticipated they have rich and sufficient information on the occurrence of disaster events (figure 1 and figure 2). Validity was established through expert judgment whereas reliability was determined using test-retest technique and reliability index, SQ $r=0.735$, TQ $r=0.827$ and NTSQ $r=0.761$ were obtained using Cronbach

Alpha Method. Credibility and dependability of qualitative data was established through detailed reporting of the research process. Qualitative data were analysed thematically alongside the research questions and presented in narrative forms while quantitative data were analysed using descriptive statistics in the SPSS version 23 and results were presented in charts, tables of frequencies and percentages.

4. Results and Discussion

4.1 Quantitative Findings on the Ways of Managing Disasters in Secondary Schools

Question one of the current study sought to examine the possible ways of managing disasters in public secondary schools in Arusha district. Table 1 and 2 present the summary of the responses and the results of quantitative findings on the possible ways of managing disasters in public secondary schools in Arusha district.

Table 1: Students' Responses on the Possible Ways of Managing Disasters in Secondary Schools(n=105)

<u>Ways of Managing Disasters</u>	SD		D		U		A		SA	
	f	%	f	%	f	%	f	%	f	%
i. Provision of fire extinguishers.	0	0	0	0	0	0	58	55	47	45
ii. Enhance drainage system & raise building foundation.	0	0	0	0	19	18	42	40	44	42
iii. Installing lightning arrester.	0	0	0	0	21	20	37	35	47	45
iv. Improve students' discipline.	0	0	14	13	10	10	37	35	44	42
v. Encourage tree planting (afforestation).	0	0	17	16	11	10	38	36	39	37
vi. Trimming of trees regularly.	13	12	10	10	10	10	39	37	33	31
vii. Reducing slope angle by excavating.	0	0	24	23	21	20	36	34	24	23
viii. Improved rescue measures.	13	12	11	10	18	17	26	25	37	35
ix. Improved national security.	11	10	14	13	10	10	32	30	38	36
x. Provision of warm clothes.	20	19	20	20	11	10	20	19	34	32

Note: SD—strongly agree, D-disagree, U-undecided, A-agree & SA-strongly agree
Source: field data (2023)

Data in table 1 shows that all (100%) of the respondents agreed that provision of fire extinguishers is commonly used as possible ways of managing disasters in public secondary schools in Arusha district council. Students

explained that at least one fire extinguisher is available in most secondary schools. The tragedy is that most students lack expert knowledge to operate it and one fire extinguisher is inadequate in case of serious fire outbreak

in an institution. Subsequently, all buildings should be allocated at least one fire extinguisher and students should be trained on how to use the gadget. To support this finding, Amuli (2019) conducted a study on the Management of Disasters in Tanzania's Secondary Schools: Policy Formulation and dissemination. The study revealed the need to have documents aimed at guiding and directing schools on effective management of fire disasters. The documents should indicate the devices available for management of fire outbreak, where they are kept, the personnel trained to handle them and the number of times the devices are serviced or repaired in case of damage. Similarly, the study suggested that all secondary

schools should have access to road that can be used by vehicles offering fire- fighting services.

Enhancing drainage system and raise building foundation was suggested as another possible way of managing disasters in public secondary schools. This statement received approval rate of 82%. School management should take the necessary measures to ensure that proper drainage system is done around classes and the entire school. In addition, contractors should be advised to raise the foundation for buildings in order to protect them against surface run off in the event of heavy rainfall as seen in figure 1.



Figure 1: Part of the Road Destroyed due to Floods in Arusha on 23rd March 2023
Source (field data, 2023)

The researcher established that floods normally occur in schools particularly during the rainy season. This is due to poor drainage system in most secondary schools in Arusha district council. For instance, the heavy rainfall in March 2023 destroyed roads, buildings and infrastructure in schools. Figure 1 indicates that when the roads were cut off due to heavy rainfall that resulted into floods, schools were not accessible and those who managed to access schools due to their proximity could not access classes because they were covered with water. The researcher established that flooding in schools occurred as a result of poor drainage system in most schools in Arusha district council.

In addition, the study established that most buildings in secondary schools in Arusha district have poor drainage system and their foundations are not raised. Therefore, the buildings are susceptible to flooding in case of heavy down pour. However, Kreitner (2019) contend that disaster management, also known as crisis management, is a methodical process used to safeguard the lives and property of people from unforeseen natural and man-

made crises. The man-made in this sense could be due to poor planning, construction of buildings that do not meet the required standard of safety and lack of training on safety measures during emergencies. In an attempt to reduce the loss caused by a calamity, the students' community should team up with teachers in assisting communities to better deal with exigencies. Many instances of students saving the lives of their fellow mate and strangers have become an inspiration for everyone to do the best they can to reduce the suffering caused by a disastrous episode. Kotter (2019) added that schools should plan ahead, make sure a sound evacuation and response plan is in place, ensure safety in all areas, check to see if all safety recommendations are being followed and practice water or fire drills if necessary.

"Improve students' discipline" (72%) was also identified as a possible way of managing disasters in public secondary schools. In this regard, certain disasters such as strike, destruction of property and burning of dormitory that are caused due to students' indiscipline can be avoided with enhanced discipline among students. The

finding in this study is supported by Ntide (2015) who asserted that due to the shortage of laboratories, especially in Africa and Tanzania in particular; the few laboratories and other infrastructure in schools should be safe guarded from the hands of indiscipline students. It has been also reported by Simtowe (2021) that in Tanzania there is a serious shortage of dormitories and laboratories in government secondary schools by more than 49 percent which affects teaching and learning in Chemistry, Biology, and Physics subjects. Teachers understand that

for effective learning of science subjects, teaching should be laced with practical. However, for reasons beyond their control, they are compelled to espouse it. For this reason, teachers tend to teach theories rather than using practical. Therefore, any attempt to destroy existing infrastructure in secondary schools should be dealt with decisively. Parents should take up their role in complementing teachers' effort in maintaining the discipline of students in secondary schools.

Table 2: Teachers' Responses on the Ways of Managing Disasters in Secondary Schools(n=85)

<u>Ways of Managing Disasters</u>	SD		D		U		A		SA	
	f	%	f	%	f	%	f	%	f	%
Provision of fire extinguishers.	1	1	0	0	0	0	36	43	48	56
Enhance drainage system & raise building foundation	0	0	0	0	19	23	23	27	43	50
Installing lightning arrester.	0	0	0	0	17	20	27	32	41	48
Improve students' discipline	0	0	4	5	10	12	27	32	44	52
Encourage tree planting (afforestation).	0	0	6	7	14	16	30	35	35	41
Trimming of trees regularly	3	3	6	7	10	12	29	34	37	43
Reducing slope angle by excavating	0	0	14	16	11	13	26	30	34	40
Improved rescue measures	3	4	11	13	18	21	16	19	37	43
Improved national security.	11	13	14	16	0	0	22	26	38	45
Provision of warm clothes.	12	14	10	12	19	22	11	13	33	39

Note: SD–strongly agree, D-disagree, U-undecided, A-agree & SA-strongly agree
Source: field data (2023)

The responses from teachers in table 2 shows that provision of fire extinguishers received approval rating of 99% as possible ways of managing disasters in public secondary schools in Arusha district council. Teachers reported that although fire extinguishers are available in most secondary schools, they are inadequate. They also noted that most teachers and students lack expert knowledge to operate them. The findings revealed that all buildings should be allocated at least one fire extinguisher and students should be trained on how to use the gadget. It beats logic as established by the researcher during document analysis that most fire extinguisher gadgets are merely used as decoration and not for the intended purpose. Majority of employees in secondary schools including students do not know how to operate them. In this regard, Bushesha and Ndibalema (2017) maintained that the purpose of the School Disaster Risk Management Plan (SDRMP) is to enhance the capacity of the school

personnel and students to prevent and to deal with disaster through training and to avoid developments which are subject to high risk of disaster. The SDRMP is to be seen as an information guide to the relevant role players. It shall advise the role players how to lead in case of a disaster such as fire outbreak in order to prevent or at least mitigate negative effects on the students and the school at large. The plan will be the basis to establish procedures which will assure maximum and efficiently utilization of all resources in and around the schools, minimize the loss of life or injury. Correspondingly, the study recommended all teachers in secondary schools to be trained on how to use fire extinguishers.

Secondly, teachers noted that enhancing drainage system and raise building foundation are possible ways of managing disasters in public secondary schools. In this regard, 77% of teachers gave their affirmative approval while 23% were undecided. Those in support noted that

stakeholders concerned should take the necessary measure to ensure proper drainage system in school and its environment. Nonetheless, contractors should raise the

foundation for buildings in order to protect them against surface run off in the event of heavy rainfall as seen in figure 2.



Figure 2: Floods in Arusha on 23rd March 2023
Source (field data, 2023)

Figure 2 shows floods in Arusha district as a result of heavy rainfall. The floods destroyed crops and some animals were swept by moving water. Few lives were lost as the rains continued to cause havoc in the region. Infrastructure such as buildings, chairs, tables and trees in schools were destroyed too. That morning, both students and teachers could not report to their respective schools while parents (employees) did not manage to report to their working stations. The study established that the foundations of most buildings in secondary schools in Arusha district are low and their drainage systems are poor. Therefore, the buildings are vulnerable to flooding in case of heavy down pour. Conversely, Woodley (2017) put forward the views that natural disasters such as floods, storms and earthquake have increased due to environmental degradation. However, schools with solid disaster management plan can save lives, minimize damage, and return to normal operations in less time. With a disaster management plan in place, schools would be able to save lives, protect resources minimize panic and with continue students' education.

During the interviews on disasters that frequently occur in secondary schools in Arusha District, one school head pointed out that:

The heavy rainfall that day came as a surprise to us. It found us completely unprepared. Schools were totally no-go zone. Even the head teachers

who were scheduled to attend education training in a seminar found it difficult to reach the venue. We had to leave our vehicles and trek all the way to town to access other means of transport. It was that bad, I tell you (Personal Interview, 21st May 2023).

The response from the school head shows that there is poor preparedness towards disaster management in most schools in Arusha district. It is important to note that natural disasters do not show signals. However, lack of repair of damages in the buildings, windows and electric faults could be early signs of disaster. Consequently, education institutions with the help of government urgencies should put in place adequate measures in order to mitigate the effects of disaster. Proper disaster management will minimize its effects towards academic achievement of students in public secondary schools in Arusha District. The findings in a related study by Peter (2014) argued that stakeholders in education should build up good crisis management policies if they are involved in decision making. However, the enforcement of these policies will enable institutions to adequately prepare for the anticipated disasters and manage them effectively instead of spending more time and resources doing damage control thereby leaving the management with limited resources to handle another crisis. Additionally, UNISDR (2018) revealed that there is need to ensure safety in all areas by checking if all safety

recommendations are being followed, and regulations guiding the country's wellbeing in the face of disasters are observed.

While conducting further interviews on the theme of possible ways of managing disasters in secondary schools, one school head remarked that:

It isn't good enough to make a disaster management plan once and never glance at it again. A useful plan is both realistic and up to date, so it's necessary for your school to revisit its disaster plan frequently. Consider creating a disaster management committee for your school. However, students' discipline is mandatory for its success (Personal Interview, 24th May 2023).

The response from the school head confirms the quantitative findings. Nevertheless, the response shows there is need for disaster management plan and disaster management committee in schools. Other possible ways of managing disasters in public secondary schools that were mentioned included tree planting (afforestation), trimming of trees regularly and reducing slope angle by excavating. Quantitative data in table 2 also indicated improved rescue measures, improved national security and provision of warm clothes as possible ways of managing disasters in public secondary schools in Arusha district council.

During the interviews on possible ways of managing disasters mentioned in secondary schools, one ward education officer pointed out that:

Two-thirds of all public-school students live in a county that experience a natural disaster. It's unpleasant to consider all of the potential disasters that could affect your school, but chances are, a disaster will affect your

community at some point. Disaster plans are only useful if you create them ahead of time with a clear knowledge. The exact details of your disaster plan will change depending on your location, but you can get started with these disaster management tips: assess your risk level, test building safety and conduct regular drills (Personal Interview, 28th May 2023).

The response indicates that ward education officer believes that almost all public secondary schools at some point in time will experience a natural or artificial disaster. Consequently, disaster preparedness is inevitable. In this regard, Bryant et al., (2017) noted that you can't control natural disasters, but you can control how your school responds to them. With hundreds of vulnerable students, staff, and teachers inside a school, it's critical to create effective disaster plans that ensure everyone gets home safely. In this case, technology is an essential part of disaster management communications tools. If properly used, it can help in saving lives.

4.2 Quantitative Findings on the How Disaster Management Affects Academic Achievement of Students in Public Secondary Schools

The second question of the current study investigated how disaster management affects academic achievement of students in public secondary schools. Questionnaires were administered to students, teachers and Auxiliary (non-teaching) staff who were required to agree or disagree with the items which were in the questionnaire. Table 3 presents the summary of the respondents' responses on how disaster management affects academic achievement of students in public secondary schools in Arusha district.

Table 3: The Responses from Respondents on How Disaster Management Affects Academic Achievement of Students in Public Secondary Schools

Statement	Students (n=105) f (%)	Teachers (n=85) f (%)	Auxiliary staff(n=50) f (%)	Total (n=240) f (%)
Proper use of fire extinguishers will minimize damages in schools hence minimal interference to learning.	103(98)	85(100)	50(100)	238(99)
Enhanced drainage system & raised building foundation will protect buildings against floods hence conducive environment for teaching/learning.	105(100)	83(98)	49(98)	237(98)
Lightning arrester will prevent frequent power blackout hence continuous learning process will be achieved.	92(88)	71(84)	42(84)	205(85)
Improve students' discipline will prevent frequent students' riots thus no interference with the school programme.	103(98)	83(98)	49(98)	235(97.6)
Tree planting (a forestation) will mitigate effects of drought thereby enhancing academic activities in schools.	105(100)	82(97)	47(94)	234(97)
Trimming of trees regularly will minimize damages to school infrastructure in case of storms.	105(100)	85(100)	49(98)	239(99.5)
Reducing slope angle by excavating will reduce the effects of landslides in schools.	103(98)	83(98)	47(98)	233(97.1)
Improved rescue measures will minimize casualties in schools in case of earthquakes.	103(98)	83(98)	47(98)	233(97.1)
Improved national security will guarantee safety in learning institutions hence academic achievement of students.	103(98)	83(98)	47(98)	233(97.1)
Provision of warm clothes will safeguard students against extreme cold weather condition hence minimal interference to the academic progress.	103(98)	82(97)	47(98)	233(97.1)

n=number of respondents, f=Frequency, %=Percentage, value in the brackets are percentage of students, teachers and Auxiliary (non-teaching) staff who agree with statement. Hence, those with contrary opinion to the statement are implied.

Source: Field Data (2023)

Table 3 shows the data on how disaster management affects academic achievement of students in public secondary schools. The distribution of responses indicates that a total of 238(99%) respondents that is, 103(98%)

students, 85(100%) teachers and 50(100%) auxiliary staff reported that proper use of fire extinguishers will minimize damages caused by fire in schools hence minimal interference to learning. It is anticipated that

minimal interference to learning will enable students to post good results in their academic work. This can be achieved by first providing adequate fire extinguisher devices and secondly, by training students, teachers and non-teaching staff on effective use of the devices. Knowledge and availability of the devices will encourage good use of the devices in case of fire outbreak thereby minimizing damage to infrastructure in schools. Whenever fire outbreak has been contained, there will be no or minimal interference with learning in school. However, when fire completely razes a building, learning is certainly negatively affected.

The researcher established that enhanced drainage system and raised building foundation will protect buildings against floods hence conducive environment for teaching/learning will be achieved. This approach on how disaster management affects academic achievement of students in public secondary schools in Arusha district was supported by 105(100%) students, 83(98%) teachers and 49(98%) auxiliary staff. Buildings constructed in secondary schools should meet the required standard of safety measures. If these measures are taken, effects of floods on school environment will be minimal and learning will continue despite heavy rainfall.

While collecting qualitative data during the interviews, one school head noted that:

Yes, most buildings have their foundation raised. However, since the ground around the school and its environment is relatively flat, the level is not adequate to prevent surface runoff. This explains why water normally enters in some classes after heavy down pour. We normally relocate students to other classes, library and school dining hall as an intervening measure and for continued learning (Personal Interview, 29th May 2023).

The school head observed that the ground level in most public secondary schools is low hence not adequate to prevent surface runoff. Therefore, there is need to raise foundation of building in order to prevent floods from accessing classes in case of heavy rainfall. A research by Ozgan (2016) on disaster preparedness found that in the United States of America (USA), there is high general countermeasures which include flood control (example, by walls, gates, dams, dikes, and levees); land-use regulations; building regulations; forecasting, monitoring, and warning system(s); relocating population; planning and arranging evacuation; emergency equipment, facilities, and materials such as special flood boats, sandbags, supplies of sand, and designated volunteers

who will implement emergency measures; and public awareness and education programs.

At the same time, 92(88%) of students, 71(84%) of teachers and 42(84%) of auxiliary staff acknowledged that lightning arrester will prevent frequent power blackout hence continuous learning process will be achieved for better academic outcome. Similarly, improved students' discipline will prevent frequent students' riots thus no interference with the school programme received affirmative approval of 103(98%) students, 83(98%) teachers and 49(98%) auxiliary (non-teaching) staff. According to UNISDR (2018), disasters are sparked by unreasonable rules, lack of ethics, lack of accountability, poor relationship between administration and workers, stress, negative peer pressure and poor communication among staff. In the same vein the study contend that the principals of schools should emphasize the need for students' discipline for good academic results and employ strong disasters management policy in order to avoid disruptive disputes.

During the interview, the heads of schools expressed their opinions on challenges related to extreme cold weather condition. A comment from among heads of school explained that:

In day schools, parents have exclusive right of providing warm clothes (pullovers) to their sons and daughters. It is disappointing to report that some parents do not provide warm clothes during extreme cold weather condition. Some students report in school putting on shirt without pullover and this has negative effect on their health particularly those who are asthmatic. The health complication eventually has a negative effect on their academic progress. Consequently, a remedial measure should be taken (Personal Interview, 29th May 2023).

The study established that in this way, it will be possible to reduce the risk factor and plan on the possible relationship between events and the actual problems which can be solved immediately and effectively. The measures to be taken resonate well with Emergency Management Theory (Klenow, 2008) that guided the current study. The theory emphasizes the need to prepare for emergencies, putting in place strategies which are more suitable in dealing with disasters. Secondly, the theory strengthens the concept that disasters vary every time so there is need to focus on prevention as well as curative measures.

4.3 Qualitative Findings on Document Analysis

Document Analysis was employed in the study to find out if the school had disaster management plan, the contents

of the plan and gadgets necessary to handle disasters. Table 4 presents the summary of the data obtained in the field.

Table 4: Data on Devices/Strategies used to Manage Disasters in Secondary Schools

<u>Disasters management strategies/devices in Secondary Schools</u>	<u>Responses</u>	
	<u>Average No. Available</u>	<u>Remarks</u>
Fire extinguishers.	2@ school	Inadequate
Enhance drainage system & raised building foundation.	Not all buildings	Inadequate
Lightning arrester.	-	-
Cases of students' indiscipline.	Several cases	
Planted trees (a forestation).	Few	Inadequate
Trimming of trees regularly.	Few cases	Inadequate
Slope angle.	Not well handled	
Provision of warm clothes.	Few cases	Inadequate

Source: Field Data (2023)

Using document analysis in table 4, the researcher ascertained that a number of sampled schools have fire extinguishers although they are inadequate. On further inquiry, the researcher established most teachers, NTS and students do not have expert knowledge on how to use the devices. In fact, they see them as part of decorations in their schools. Therefore, the study confirms that presence of devices such as fire extinguisher do not help in combating disaster because some are poorly serviced, no trained experts to use them and they are not available in each building. In addition, the researcher assessed drainage system within the school environment and the level of foundation of each building in the school was found not able to protect buildings against floods. Cases of students' indiscipline planted trees and provision of warm clothes during extreme cold were assessed and found to be inadequate.

5. Conclusion and Recommendations

5.1 Conclusion

Based on the findings of the current study, the following conclusions were drawn:

The result of the study on the first objective revealed that there are various ways employed by different institutions and education stakeholders to manage disasters. These include; provision of fire extinguishers to help in putting off fire outbreaks, enhancing drainage system and raising building foundation to prevent surface runoff from

accessing classrooms and offices, improving students' discipline to prevent strikes and arson attack from students and encouraging tree planting (afforestation) to control wind calamities. Other possible ways of managing disasters in schools include having quality school building, proper installation of electricity, and proper management of building. However, training of students, teachers and auxiliary staff on the use of fire extinguisher gadget is necessary while guidance and counselling of students to check on their discipline is advisable.

Finally, the study established that proper disaster management will positively affect academic achievement of students in public secondary schools in Arusha district. For instance, proper use of fire extinguishers will minimize damages caused by fire in schools hence minimal interference to learning process and students will record progress in their academic work. Enhanced drainage system and raised building foundation will protect buildings against floods hence conducive environment for teaching and learning. Improved students' discipline will prevent frequent students' riots thus no interference with the school programme therefore, students will concentrate in their studies for better academic achievement.

5.2 Recommendation

Based on the study findings the following recommendations were made:

1. The ministry officials should change the current approach to policy formulation by incorporating ideas raised by all stakeholders in education on how to overcome disasters such as fire outbreaks. In this regard, only workable policies should be formulated and reinforced.
2. There should be training of individuals on how to use fire extinguishing devices and proper communication should be put in place in order to convey information about disasters in schools and ways of managing disasters in public secondary schools in Arusha district.
3. There is need for increased government capitation in order to enable school administrators to cater for their recurrent expenditure such as hiring the services of experts in security matters that would help them manage such disasters for academic achievement of students in public secondary schools.
4. The MoEST should, therefore, build the capacity of school monitoring teams, such as the School Quality Assurers, to visit schools regularly for monitoring the implementation of policies issued by the MoEST and how to manage disasters.

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