

**FIRE DISASTER PREPAREDNESS STRATEGIES IN  
SECONDARY SCHOOLS IN NYERI CENTRAL DISTRICT,  
KENYA**

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**A Research Project Submitted in Partial Fulfilment of the  
Requirements for the Award of the Degree of Master of  
Education in Education in Emergencies, University of Nairobi.**

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## **DECLARATION**

This research project is my original work and has not been presented for the award of degree in any other university.

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This research project has been submitted for examination with our approval as university supervisors.

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## **DEDICATION**

To my son Anthony Mwangi and my late mother Mary Wangui Gichuru.

## **ACKNOWLEDGEMENT**

Special thanks to the University of Nairobi Management for providing me with a conducive environment which has enabled me to complete my course work successfully and to carry out the study. Thanks to my supervisors Dr. Grace Nyaga and Dr. Daniel. K. Gakunga who have gladly shared their expertise and experience and provided me with constant guidance during the working time. I highly appreciate all the help and support given.

I wish to thank the principals, teachers and students who participated in this study. Additional thanks to my typist and data analyst for making the study successful.

I would like to express my deep appreciation to my son, my sister and brothers for their unwavering love and support. I would also like to express my deepest gratitude to my colleagues and classmates for their encouragement, support and advice.

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## **LIST OF ABBREVIATIONS AND ACRONYMNS**

<b>AP:</b>	Assembly Points
<b>DEO:</b>	District Education Officer
<b>EP:</b>	Emergency Plans
<b>FD:</b>	Fire Disaster
<b>FFE:</b>	Fire Fighting Equipment
<b>FFF:</b>	Fire Fighting Facilities
<b>FS:</b>	Fire Safety
<b>ICFI:</b>	International Committee of the Fourth International
<b>MOEST:</b>	Ministry of Education Science and Technology
<b>NCST:</b>	National Council of Science and Technology
<b>QUASOs:</b>	Quality Assurance and Standards Officers
<b>SPSS:</b>	Statistical Package of Social Sciences Software
<b>SSS:</b>	Specific School Stakeholders
<b>UNISDR:</b>	United Nations International Strategy for Disaster Reduction
<b>WCDR:</b>	World Conference on Disaster Reduction

## ABSTRACT

Most schools in Kenya have no capacity to handle emergencies like fire and are yet to even implement safety standards manual produced in 2008 by the Ministry of Education. Fires in schools are a public concern because of the increased incidences, injuries and deaths of students not to mention the destruction of property. Despite this, schools seem not well prepared for fire disasters. Without fire preparedness, schools will continue to lose lives, property and learning time. The purpose of this study was to investigate fire disaster preparedness in the secondary schools in Nyeri Central District.

The study was guided by the following objectives: to establish the adequacy of fire fighting facilities for fire disasters within the school premises; to determine how school buildings are built in accordance with policy provisions pertaining fire disaster preparedness; to examine how secondary schools have put in place fire safety plans as a measure of fire disaster preparedness and to establish how secondary schools train teachers, workers and students on appropriate responses in case of fire. The research adopted a descriptive survey. The target population for this study consisted of all public secondary schools in Nyeri Central District. This study employed stratified sampling technique to obtain the sample population. Data was collected by means of questionnaires administered to the principals, teachers and learners of the sampled schools and an observation schedule. Data collected from respondents was analyzed through descriptive statistics. The results were presented using frequency tables.

Based on the findings of the study, the fire fighting equipment in most schools is inadequate and rarely inspected contributing to fire disaster unpreparedness. In relation to school buildings and fire safety, most schools have made effort to improve fire disaster preparedness but their preparedness is still poor and needs to be improved. On safety plans, most schools are not prepared in fire disaster management because emergency plans for fire disaster in schools are at most average. Most schools lack fire alert procedures. Most schools have only one assembly point while the majority have none. Most schools do not remind the immediate stakeholders of the emergency plans. Regarding training on fire safety, most school stakeholders are not trained on fire safety because there has never been a need to train on fire safety and there are no materials to teach with.

Based on the findings of the study, the researcher recommended that school management should consider adding the fire fighting equipment to make them adequate and they should also be regularly inspected. It is also recommended that fire extinguishers should be easily accessible, windows should not be grilled, exits should be cleared of obstructions, fire extinguishers should be increased and doors should open outwards. In addition, head teachers, teachers, non teaching staff and

students should be made aware of evacuation plans, all stakeholders should be reminded of evacuation plan, assembly points should be identified and stakeholders notified, schools should have fire alert procedures and schools should have many assembly points in case of a fire. Finally, all stakeholders should be trained on fire safety. The study suggested that a similar study should be done in other areas in Kenya to check on fire disaster preparedness in schools as cases of fire disasters are on the rise in Kenya.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the Study**

The threat of fire disasters is always present, and it is important that people are aware of how to properly respond in order to lessen loss of property, injuries and deaths. This is especially true for learners in schools (Marion & Maingi, 2010). Schools should have emergency preparedness plans to guide students to safety. According to Makhanu (2009) fire is one of the commonest disasters in learning institutions in Kenya. Like any other disaster, whenever it happens, it causes a serious disruption of the functioning of the institutions since it results into widespread human, material, economic or even environmental losses which exceed the ability of the affected institutions to cope using their own resources.

Although a fire disaster need not necessarily reach catastrophic proportions, it does present some of the characteristic aspects of a disaster because of the highly destructive action of fire and of the considerable number of victims (UNISDR, 2007). The surviving casualties often have mainly serious and extensive burns requiring immediate rescue procedures that cannot always be provided by local resources. Preparedness planning is to ensure a rapid and efficient action when disaster occurs, taking into consideration the local disaster management system and adjusting it according to the local condition. The school ought to prepare human resource, facility, infrastructure and financial support for disaster management to ensure the school's disaster preparedness (Kukali, 2009).

Resource mobilization is based on the capacity of school and school stakeholders. The mobilization should be open for other stakeholders to take part.

Shaw (2002) observes that international efforts have been made on promoting school safety, manuals have been written, curriculum adjustments, guides and training materials have been distributed as well as national, regional and international meetings have been organized by bodies such as the World Conference on Disaster Reduction (WCDR). A WCDR resolved that education should help build a culture of safety at all levels and this begins at school by mobilizing efforts to integrate disaster preparedness infrastructures and procedures into school curricula (UNISDR, 2007). This development has reinforced the need to work in more collaborative, comprehensive ways in improving safety in schools. A number of countries have developed cross-sectional, national, regional or local strategies on implementing school safety that recognize the multidimensional causes of school safety problems and the need for preventive long term plans that encourage partnerships between schools and other stake holders. The strategies also provide information necessary for funding of project development and implementation, including training and technical assistance.

Disasters are worldwide phenomena that range from being highly localized to global in scope. Regardless of their origin and classification, all disasters have a



public health importance due to their potential to cause loss of lives and livelihoods (Marion & Maingi, 2010). In 1998, a kerosene lantern overturned and killed 23 girls in a dormitory in Nigeria (Rowan, 2001). In July 2004, fire in an Indian school killed 90 pupils because of lack of emergency doors and fire fighting equipments (Reuters, 2004) and 21 girls in Budo boarding school in Uganda lost their lives through arson (Mzungu, 2008). The report documenting the Indian school fire of July 2004 blames the disaster on failure to implement safety norms. The school building in this case was overcrowded and had only one exit. There were no emergency doors or fire fighting equipment. School fire disasters in India, are blamed on failure by authorities to enforce safety norms. For instance, schools may stay for as long as three years without being inspected (Reuters, 2004).

The wave of fire disasters sweeping through Kenyan schools has left many puzzled as to what exactly could be going on in schools and what can be done to contain the situation. Several students have lost their lives to fire incidents. Interventions to curb fires have brought to light the living conditions of students and the disregard of government policies. In 1998, 26 girls perished in Bombolulu secondary school when their dormitory caught fire (International Committee of the Fourth International, 2001). Reports indicated that the dormitory was overcrowded, doors to the dormitory were narrow and locked from the outside and the windows were barred. There were also no fire extinguishers (Mangoa,

2012). In 2001, 67 students died in a night inferno at Kyanguli High School in Machakos. Eight pupils at Asumbi Primary School died in 2012 in a fire disaster. According to a Homa Bay District Commissioner report, the girls were locked in the dormitory. In Maranda High School a fierce fire burnt down a dormitory (Oduor, 2012).

The increasing frequency of fire disasters in educational institutions is causing loss of lives, enormous destruction of property, disrupting education programmes and causing a lot of concern to the public. These incidences of fires in educational institutions are indication of poor disaster preparedness (Kirui, et al, 2007). According to Artim (1999), the most worrying aspect is that society has adopted a reactive rather than proactive perspective to the problem of fire in schools; many a times, preventive measures are not put in place, but rather its only after the disaster strikes that funds are mobilized for reconstruction of the destroyed facilities and little psychosocial support (if any) offered to the survivors. This has resulted in the problem recurring over and over again, thus adversely affecting the resources' sustainability by retarding development through reconstruction and repair work.

Nyeri Central District has also had it fair share of fire disasters. Ngunjiri (2012) reports that fire reduced a dormitory at Giakanja Boys Secondary School to ashes and an adjacent dormitory was also destroyed in the process as students tried to salvage their personal belongings. Efforts to put off the fire were futile as the

school lacked facilities to contain the emergency and had to await the fire engine from Nyeri Municipality about 10 kilometres away. The Sunday night disaster was in many ways similar to another one perpetrated by students at Nyeri High School against their prefects on the early morning of May 24, 1999. In 2010, two boys were burnt to death in their sleeping quarters at Endarasha Boys Secondary School dormitory in Nyeri County. Investigations indicated they were trapped when a fire broke out as the charred remains of the two students, lay near an exit door (Njagi, 2010).

According to Otieno (2010) it is emerging that most schools in Kenya have no capacity to handle emergencies like fire, and are yet to even implement safety standards manual produced in 2008 by the ministry of education. Schools in the developed countries are usually well prepared in case of fire disasters. This is partly because they have invested in education in emergencies. Education in emergencies was introduced in Kenya a few years ago. However, it is not learnt in many educational institutions and it might be many years before it is offered in all the universities in Kenya. This implies that it might take a long time before most Kenyans learn how to be prepared in case of disasters. Despite the many cases of fires disasters in Kenyan schools, schools in Nyeri Central District do not seem to be well prepared in case of fire disasters. It was therefore imperative to carry out a study on the schools' preparedness as far as fire disasters are concerned.

## **1.2 Statement of the Problem**

In Nyeri Central District, school fire disasters have been reported in Nyeri high School, Giakanja Boys Secondary School and Endarasha High School among others. Fires in schools are a public concern because of the increased incidences, injuries and deaths of students not to mention the destruction of property. Even if schools may face other problems like strikes and indiscipline, these rarely result into deaths like fire disasters. From the literature in the background, it is clear that schools seem not well prepared for fire disasters. Without fire preparedness, schools will continue to lose lives, property and learning time. It was therefore important to carry out a study on fire disaster preparedness in secondary schools in Nyeri central district, Kenya. The study sought to establish the adequacy of fire fighting facilities, whether buildings are built in accordance with policy provisions pertaining fire disaster preparedness, fire safety plans of the school and whether schools train teachers, workers and students on appropriate responses to fire disasters.

## **1.3 Purpose of the Study**

The purpose of this study was to investigate fire disaster preparedness in the secondary schools in Nyeri Central District.

#### **1.4 Research Objectives**

The study was guided by guided by following objectives:

- i. to establish the adequacy of fire fighting facilities for fire disasters within the school premises in Nyeri Central District
- ii. to determine the extent to which school buildings are constructed in relation to policy provisions pertaining to fire disaster preparedness in Nyeri Central District
- iii. to establish how secondary schools have put in place fire safety plans as a measure of fire disaster preparedness in Nyeri Central District
- iv. to determine whether secondary schools train teachers, workers and students on appropriate responses in case of fire in Nyeri Central District

#### **1.5 Research Questions**

This study sought to answer the following research questions.

- i. Do schools in Nyeri Central District have adequate of fire fighting facilities for fire disasters?
- ii. To what extent are secondary school buildings constructed in relation to policy provisions pertaining to fire disaster preparedness?
- iii. To what extent have secondary schools put in place fire safety plans as a measure of fire disaster preparedness?
- iv. Do secondary schools train teachers, workers and students on appropriate responses in case of fire?

## **1.6 Significance of the Study**

This study was important because the study findings were hoped to create awareness among the school management, teachers, workers and the students on what need to be done in order to make secondary schools prepared in case of fire, hence minimizing damage to property, injuries or death. The finding of this study might also contribute to the literature and fill in the gaps of knowledge about fire disaster preparedness in secondary schools in Nyeri Central District. In addition, the findings of this study might lead to openings that could lead to more comprehensive policy implementation on safety in schools. Finally, the school stakeholders might be made aware of the level of fire disaster preparedness in the schools and as a result they might see the need to improve it.

## **1.7 Limitations of the Study**

During the study, the researcher encountered several challenges. The researcher was not in a position to control the attitudes of the respondents. However, the researcher explained the importance of this study in an effort to have a positive attitude by the respondents. In addition, the respondents were assured that their identity would not be revealed and this increased the chances of getting accurate information from the respondents.

### **1.8 Delimitations of the Study**

This study was carried out in Nyeri Central district, specifically the 18 public secondary schools in the district. The target population was the principals, teachers and students in these schools. The study focused on adequacy of fire fighting facilities, whether buildings are built in accordance with policy provisions pertaining fire disaster preparedness, fire safety plans of the school and whether schools train teachers, workers and students on appropriate responses to fire disasters.

### **1.9 Assumption of the Study**

The study was carried out on the assumption that all the respondents would answer all the questions honestly and to the best of their abilities.

### **1.10 Definition of operational terms**

**Disaster refers** to an event or series of events, which give rise to casualties and/or damage or loss of property, infrastructure, and essential services.

**Fire disasters** refer to uncontrolled burning that threatens human life, health, property or ecology.

**Fire fighting equipment** refers to the tools for fighting like fire extinguishers, axes and cutting equipment and hose ramps

**Fire Policy provisions** refers to the principle of actions outlined in case of fire by the ministry of education or the school

**Fire safety plans** refers to guides on what one should do in case of a fire.

**Preparedness planning** refers to measures taken to ensure a rapid and efficient action when disaster occurs, taking into consideration the local disaster management system and adjusting it according to the local condition.

**Strategy** refers to a plan of action or policy designed to achieve fire preparedness in schools

### **1.11 Organization of the Study**

This study was organized in five chapters. The first chapter which is introduction covered background to the study, statement of the problem, objectives, research questions, significance, limitations, delimitations, assumptions and definition of significant terms. The second chapter reviewed the past literature regarding fire disaster preparedness in schools. It also had a theoretical and a conceptual framework and a summary of the chapter. In the third chapter which is research methodology, the research design to be used was highlighted. The target population was established with the right sample size. It also had data collection instruments to be used. The researcher highlighted the methods of analysing and presenting data. Chapter four focused on data analysis, interpretation and presentation. Section five was composed of summary, conclusion, recommendations and suggestions for further research.



## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 Introduction**

This chapter deals with review of related literature of this study. Specifically, review focused on school emergency plans, fire vulnerable places in schools places, measures that can be put in place to minimizing the spread of fire, training that can be offered to teachers, students and all individuals in order to make appropriate responses in case of fire and the appropriateness of schools buildings designs in case of a fire as well as the theoretical framework

#### **2.2 The concept of fire disaster preparedness in schools**

According to Makhanu (2009) schools around the country have failed to emphasis on installing fire protection equipment, alarms, and first-aid and fire fighting. Vulnerability of schools to fire disasters is usually attributed to the following factors. Foremost, hostels may not be of fire-resistive materials; they lack important fire protection equipment or are not operational at the time of the fire. Such a state is hazardous and a recipe for fire disaster. Common examples include: installed ventilators that are not in operation; exits that are permanently locked or grilled especially windows; no installed alarm system; no fire protection devices such as fire extinguishers and standpipes; rotten hose pipes; hostel exit

doors that open inwards instead of outwards, such that in event of emergency so many students pushing toward the door would jam it and eventually caught up as none would escape. Also entry roads for extinguishers may be inaccessible especially.

Akali, Khabamba and Muyinga (2009) observe that little has been done to prepare schools for fires. Only a handful of schools have fire extinguishers in offices, laboratories, stores and kitchens and even these are not regularly serviced. Furthermore, many public schools run on a shoe-string budget and cannot afford the luxury of fire fighting equipment. School inspectors (QUASOs) hardly perform safety assessment during routine checks in schools. Limited supply of water i.e. many schools experience water shortages more often and lack hydrant points that would be effective in putting out fires. Kumba (2008) reports that the Ministry of Education introduced new rules to improve safety in all provincial secondary boarding schools be given between Sh150, 000 and Sh350, 000 each to buy fire-fighting equipment. Every school was requested by the government to set up a safety committee. However, there are many schools which have not complied with such rules.

Makhanu (2009) adds that fire fighting equipment and other life saving devices should be generously displayed where they can be easily spotted even when one is extremely frightened. Teachers, learners and the subordinate staff should be routinely reminded about their existence and how to use them. For established

institutions, automatic sprinkler, alarm and kitchen hood fire protection must be installed during the reconstruction or major repairs phases. There should be promptness in notifying the fire department for external assistance as employees and students attempt to extinguish the fire themselves. Construction, installation and maintenance processes, including periodic inspections should be done in a manner to insure safety and usability of fire fighting equipment. Fire fighting resource persons could be invited for such exercises. However, most of these activities have not been carried out in the secondary schools in Kenya. Even the schools that have fire extinguishers may not teach learners how to use them. Resultantly, in case of a fire disaster, schools are still unprepared.

### **2.3 Adequacy of fire fighting equipment in schools**

There are many schools which do not have adequate fire fighting equipment (Shaw, 2002). Ians (2010) on a study in India discovered that as many as 1,200 schools in the national capital, including some top privately run institutions, are flouting fire safety norms. He said most schools seemed more interested in admitting a large number of children instead of providing them a safe environment. He further noted that many schools in the capital start operation with a “temporary” no objection certificate (NOC) on the understanding that they would install the necessary equipment within one year. However, many educational institutes never go back to the fire department for getting a permanent NOC. While many government schools do not have basic fire-fighting equipment,

many private schools have not bothered to get their facilities certified from the fire department.

Mwenga (2008) on a study to establish the safety preparedness of secondary schools in Kyuso District, Kenya established that in this district there are no adequate fire fighting equipments in the schools as majority, 43% had between 1 - 5 fire fighting equipments. In addition, the number of fire fighting equipment, fire fighting points and first aid kits were found to be un-proportional to the size of the schools and the number of students hence inadequate to deal with any emergency. The schools rarely trained their students on safety measures as indicated by 44.5%, hence the students were not well-equipped with necessary training needed to handle emergencies in the schools. In addition, the members of staff and school matrons were not well-trained on fire fighting techniques since only 56.0% were fairly trained.

Lucheli and Masese (2009) also noted that the high cost of fire fighting equipment has made it impossible for North Rift schools to install the kits. Though many schools have removed grills from windows and installed double doors in dormitories, they lack fire extinguishers. Following the 2001 fire disaster at Kyanguli in Machakos, where 67 students lost their lives, the Government gave money to secondary schools for safety measures. However, Lucheli and Masese (2009) observed that most schools lacked fire extinguishers and where they were available; they were not in good working condition. Most schools have tried to

meet the safety requirements, but fire extinguishers are still a challenge. The principals in this region reported that schools acquired fire fighting equipment from one company with Government funding, but what the company delivered was substandard. After the Government stopped funding, schools started single sourcing, but stringent budgets frustrated their efforts. In Nyanza, more than 1,000 secondary and 5,000 primary schools do not have sufficient fire fighting equipment. This shows how ill-equipped schools are to fire in case of a fire disaster hence fire unpreparedness.

#### **2.4 School buildings and fire safety**

Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building. For some buildings the doors could be too small for speedy intervention or that buildings were not well designed to allow free movement beyond some points (Rowan, 2001). In such cases, fire extinguisher materials may not adequately reach targets. Combustible materials must not be used for decorations or in building components-this would usually accelerate heat transfer to sufficient temperatures raising the combustible materials to the point at which they would burn. Occupancy limit requirements should be strictly enforced so that hostels should accommodate beyond recommended numbers. Exits need to be kept clear of obstructions and plainly marked. In this regard windows should not be grilled to allow complete opening

in event of an emergency. Exit doors should swing in the direction of exit traffic flow. Public assembly buildings/halls must have two separate means of exit, remote from each other. As an outdoor event fire safety, avoid waterproof measures on equipments like tents which in themselves carry potency for disaster or are hazardous. For instance, coating tents with a covering of paraffin thinned by using gasoline presents a highly flammable covering (Marion & Maingi, 2010).

Oduor (2012) observes that the Ministry of Education introduced recommendations that classrooms should only accommodate between 30 and 40 students to reduce congestion. One evident thing with fire disasters is that boarding facilities in most schools in Kenya are designed to lock students in, whatever the circumstances; the country's conservative society apparently does not trust its youth to do the right thing. Disasters like Kyanguli, however, show that this approach, where students are barricaded in dormitories designed like security facilities, invites disaster. This is a further implication that even though schools have made effort to prevent and manage fire disasters, fire disaster preparedness is still poor.

Fire disasters are by far the most common disasters in learning institutions in Kenya (MOEST, 2001). Vulnerability of learning institutions to fire disasters is contributed by, among other factors, lack of safety measures like adequate exits,

fire fighting equipment and insufficient fire fighting resources; absence of an evacuation plan in event of fire strike; unawareness by vulnerable persons (students) about imminent fire; being within the risk factor, for example, being in the burning building and becoming a victim; poor installation and storage of inflammable material; easy access to hazardous fuels and flammable materials. The culture of student unrest in learning institutions has increasingly taken a violent and destructive trend.

More badly, studies MOEST (2001) indicate that such unrests are premeditated, planned and executed to yield maximum harm to human life and extreme destruction to property. There is need for a tangible disaster preparedness and risk reduction policy targeting learning institutions as a way of raising awareness particularly on the unpredictable disasters like fire. Years of development efforts are destroyed and subsequent operations of the affected institution grossly disrupted. Reactive measures like seeking assistance from Constituency Development Funds, well-wishers and going back to already impoverished parents does not yield much. Disaster preparedness and risk management interventions will empower learning institutions to safeguard against fire related disasters. This implies that there are many strategies that the educational institutions can use to improve fire preparedness in schools.

## **2.5 Fire safety plans in schools**

According to White (2011), every fire safety system should also include an emergency preparedness plan that documents important information on procedures for responding to an emergency, such as fires, earthquakes, terrorism, and school violence incidents. Because the safety of the students is of the utmost importance, this plan is essential. In addition, schools can also serve as emergency shelters, so it is recommended that there is plan for town-wide crisis situations as well. The document should follow the National Incident Management System (NIMS) and should outline standard operating procedures and guidelines, provide for fire drills, include a list of key contacts with addresses and night-time phone numbers and establish a chain of command and appropriate officers. The document may contain maps or plans of egress routes and locate safe havens.

Nakitto and Lett (2012) did a study on the preparedness of Ugandan schools for fires. Fifty schools (day and boarding) were randomly chosen in the five divisions of Kampala. The findings of the study showed that 84 percent of schools had no fire safety plans in place. They further established that majority of Ugandan schools are not prepared to deal with fires. They proposed that fire safety policies and standards should be addressed by the Ministry of Education and School Management (Nakitto & Lett, 2012).



Ndiang'ui (2006) on a study on vulnerability of Kenyan schools to fire disaster observed that to some extent, the degree of exposure to fire disasters in schools is influenced by the administrative framework of the school. For example, lack of early warning systems to help control fire in its early stages; lack of disaster preparedness plans; lack of fire drills and First Aid Kits; lack of basic training on security; lack of fire extinguishers in key areas or lack of emergency exits etc expose schools to disasters. She concluded that adequate strategies have not been put in place to cope with fire disaster and schools are not prepared at all for disasters. She proposed that to achieve reasonable levels of minimization, it is necessary to reduce the adverse effects of disasters through effective precautionary measures like having fire safety plans.

## **2.6 Training of teachers, workers and students on fire safety**

Makhanu (2009) observes that fire and safety departments in most learning institutions are non-existent or members are not trained or equipped to fight a fire in the school. This could either be as a result of naturalist attitude that God would take care of all unpredictable disasters or could be as a result of sheer negligence or both. The safety of school occupants will be enhanced if staff knows what to do both before and during an outbreak of fire or other emergency. This can be achieved by ensuring that staff including temporary and part-time personnel receives appropriate instruction and training. All new entrants to a school be they students pupils, staff or support staff, should be conducted around the primary

escape routes of the school. They should also receive instruction on the school fire evacuation routine and receive instruction and training appropriate to their responsibilities in the event of any emergency.

Makhanu (2009) added that all members of staff should each receive a personal copy of prepared written instructions as well as receive verbal instructions given by a competent person. Such instruction shall include details of how to call the Fire Brigade. A record of the training and instructions given and fire drills held shall be entered in the log book and will include the following: date of the instruction or fire drill, duration, name of person giving instruction, name of the person receiving instruction, nature of instruction or fire drill. Fire drills, which may be combined with the instruction given above, should be carried out at least once per term. The fire drill should simulate that one escape route is not available. Each fire drill should be started by a pre-determined signal and the whole premises checked as if any evacuation was in progress. In large schools a specific person shall be made responsible for organizing staff training and to co-ordinate the actions of the staff in the event of fire. Effective arrangements should be made for a deputy or deputies to carry out the above duties in the absence of the nominated persons. The fire safety policy guideline requires that fire drills to be done twice every term.

According to Kukali (2009) lack of basics about fire safety issues or on how to react in event of fire disaster is to blame for the large number of casualties experienced. Basic fire emergency drills to workers or students are often taken for granted to the extent that in event of a fire very few workers or students may know what to do. In fact a number of them, faced with the prospect of a horrible death by fire, may chose to leap to their deaths from windows or roof tops of the fated buildings at whichever height. On the other hand, some employees who are first to spot the fire burning could be too frightened, and may choose to run away instead of raising alarm. Basic training on the use of fire fighting equipment and other life saving skills in event of fire disaster must be regularly done. All new members of the institutions must be inducted in basic fire safety skills. In Kenyan schools, this kind of training does not occur. Teachers and learners may be told on what to do generally in case of a fire disaster but its practicality is rarely done. This implies that fire disaster preparedness in schools is still poor.

## **2.7 Summary of literature review**

The reviewed literature revealed that fire disaster preparedness is essential in all secondary schools and those losses, injuries or even fire related deaths can be averted if schools put in place measures to contain fire incidents. While some schools have bought fire fighting equipment and adjusted their structures to help fight fire disasters, others have not. Some of the schools with equipment have not fully trained teachers and learners on the way to use them making the schools

unprepared for fire disasters. This implies that there is still a knowledge gap as far as fire disaster preparedness of schools is concerned. That made imperative to carry out this study.

## **2.8 Theoretical Framework**

The theoretical frame work model adopted for this study is the Protection Motivation Theory (PMT) (Rogers, 1983). This is a health behaviour-change model, which explains how individuals adopt protective behaviours when faced with a risk (Rogers, 1983). The theory stresses that a fear-arousing communication works to the extent that it arouses “protection motivation” or motivates the individual to protect himself/herself against a threatening outcome (Perloff & Bay, 1991).

According to the theory, people’s intentions to protect themselves from harm are enhanced by four critical beliefs or perceptions, regarding severity of risks, vulnerability to the risks, perceived efficacy of a protective response and self-efficacy at performing advocated behaviour. Additionally, the theory posits that people’s intentions to protect them are weakened by the perceived costs of the advocated risk-reduction behaviour and the perceived benefits of the opposing risk-enhancing behaviour (Pechmann, 2003). Since people can be motivated to engage in desirable behaviours not only to avoid risks but also to avoid social or

interpersonal risks, the Protection Motivation Theory has been subsequently extended to include social risks as well (Ho, 1998).

The PMT posits that in most cases beliefs will affect intention directly and additively, though at times some beliefs will function interactively or synergistically (Pechmann 2003). PMT outlines the cognitive responses resulting from fear appeals, Rogers (1983) proposed that various environmental (e.g. fear appeals) and intrapersonal (e.g. personality) sources of information can initiate two independent appraisal processes: threat appraisal and coping appraisal. Threat appraisal focuses on the source of the threat, and factors that increase or decrease the probability of maladaptive responses (e.g. avoidance, denial, wishful thinking). Individuals' perceptions of the severity of and their vulnerability to, the threat are seen to inhibit maladaptive responses.

The theory is applicable to fire disasters as explained by Pechmann, (2003) who added that in relation to fire disaster, individuals may consider the seriousness of fire and their chances of destroying property and people in the future. Fear is an additional, intervening variable, between perceptions of severity and vulnerability and the level of appraised threat. Thus, greater levels of fear will be aroused if a student or a teacher perceives him/herself to be vulnerable to a serious fire threat and this will increase an individual's motivation to engage in protective behaviour. While perceptions of severity and vulnerability serve to inhibit

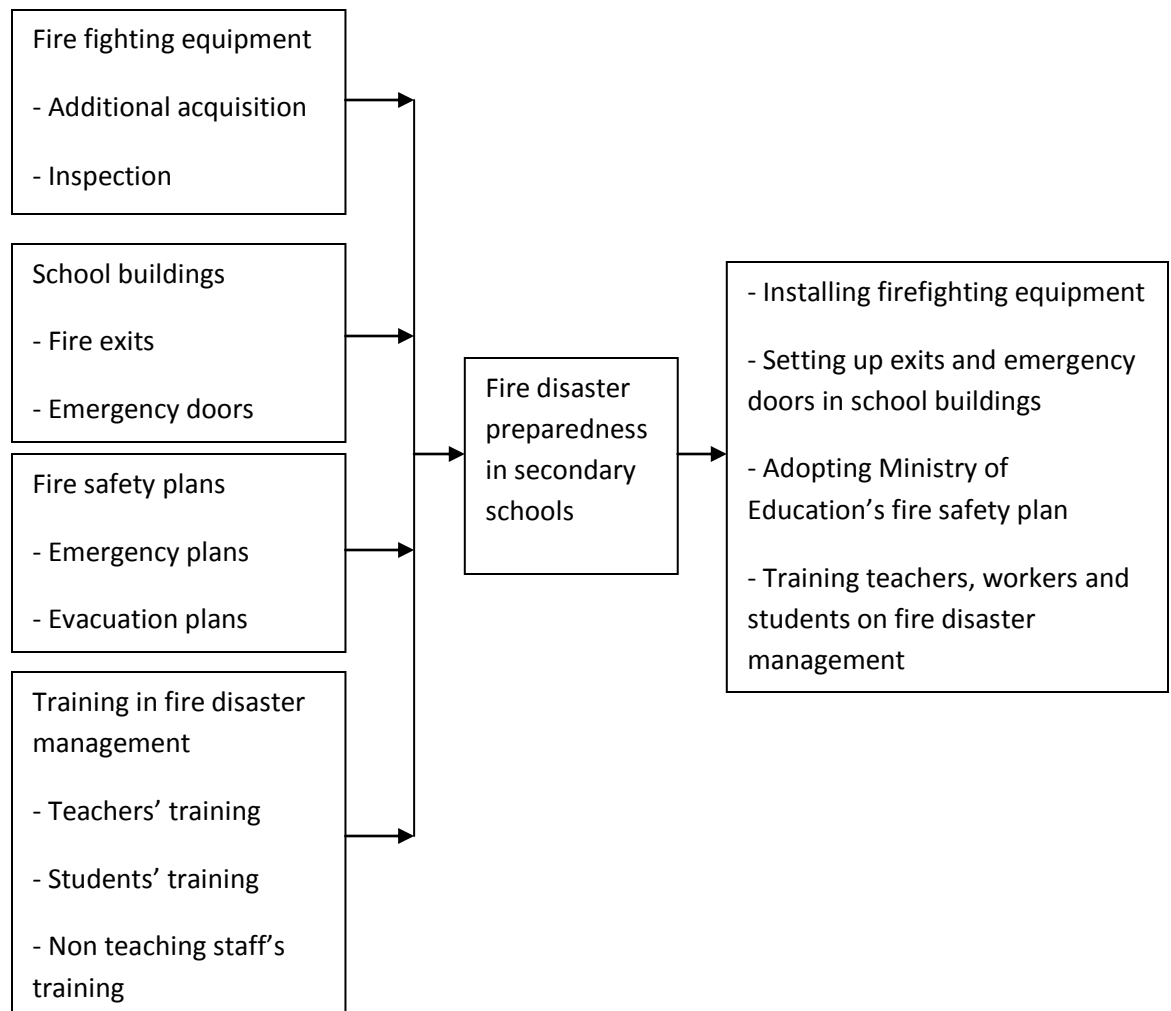
maladaptive responses, there may be a number of intrinsic (e.g. pleasure) and extrinsic (e.g. social approval) rewards that increase the likelihood of maladaptive responses. Coping appraisal focuses on the coping responses available to the individual to deal with the threat and factors that increase or decrease the probability of an adaptive response, such as following behavioural advice.

Both the belief that the recommended behaviour will be effective by reducing the threat (i.e. response efficacy) and the belief that one is capable of performing the recommended behaviour (i.e. self-efficacy) increase the probability of an adaptive response. For example, schools may consider the extent to which preparedness would reduce their chances of developing destructive fires in the future and whether they are capable of doing so. While perceptions of response efficacy and self-efficacy serve to increase the probability of an adaptive response, there may be a number of response costs or barriers (e.g. availability of resources) that inhibit performance of the adaptive behaviour. This means that the schools administration may perceive fire disasters as dangerous and therefore make plans to equip the schools with fire fighting equipment. However, they might be limited by finances and this implies that they would be forced to use fewer strategies for fighting fire disasters thus increasing their level of fire disaster unpreparedness.

## 2.9 Conceptual Framework on fire disaster preparedness in schools

The conceptual framework is the schematic diagram which shows the variables included in the study and their interrelationships. The study's dependent variable is fire disaster preparedness in schools. Its independent variables are fire fighting equipment, school buildings, fire safety plans and training of teachers, workers and students on fire disaster management.

**Figure 2.1 Conceptual framework**



The independent variables are directly linked to fire preparedness in schools. For example, the schools with adequate fire fighting equipment are more prepared in case of fire disasters than the schools without or with inadequate equipment. On the other hand, schools with enough emergency doors and fire exits are better prepared for fire disasters than schools without. Schools that have fire safety plans would know what to do in case of fire. This means that they would be better prepared than the schools without such plans. The schools which have trained their teachers, workers and students on fire disaster management are more prepared in case of a fire disaster than a school where there has been no training on fire fighting.



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter deals with the research methodology used in the study. It includes research design, target population, sampling procedure and sample size, research instruments, validity and reliability of research instruments, data collection techniques and data analysis.

#### **3.2 Study design**

The study adopted a descriptive survey design to gather data. Kombo and Tromp (2006) defined a descriptive survey as a method of research which gathers data at a particular point in time with the intention of describing the nature of existing conditions of, or determining specific information. This method was appropriate for this study because it is an effective way of collecting data from a large number of sources relatively cheaply and within a short time. In addition, the design was used because the subjects were observed in a completely natural and unchanged natural environment without influencing them (Kothari, 2004).

#### **3.3 Target Population**

The target population for this study consisted of all public secondary schools in Nyeri Central District. These were the 11 district secondary schools, 6 county

schools and 1 national school making a total of 18 schools. There are 11,240 students and 281 teachers and 18 principals (D.E.O, 2013). These made the target population of the study.

### **3.4 Sampling procedure and Sample size**

This study employed stratified sampling technique. Stratified sampling technique was used to select the schools to be included in the sample. Stratified sampling technique is a technique that identifies sub groups in the population and their proportions and select from each sub group to form a sample. It aims at a proportionate representation with a view of accounting for the differences in sub-group characteristics (Oso & Onen, 2005). Stratified random sampling technique ensures that each sub group in the target population is represented in a sample in a proportion equivalent to its size in the accessible population. According to Orodho (2005) good representative sample should constitute at least 20% of the entire population where population is small. However, Kothari (2004) added that a bigger sample better represents a population. In this case, 9 schools which was 50% of the target schools were selected. Out of 281 teachers, 56 teachers which was 20% were selected and 1124 of students who constituted 10% were selected through simple random sampling so as to give every subject an equal chance to be selected.

### **3.5 Research Instruments**

Data was collected by means of questionnaires administered to the principals, teachers and learners of the sampled schools and an observation schedule. The questionnaire consisted of open ended and closed ended questions and it was divided into five sections. Questionnaires are preferred for collecting data because their wordings and sequence are fixed and identical to all respondents. This had the advantage of obtaining standard responses to items in the questionnaire, making it possible to compare between sets of data. According to Orodho (2010), this method can reach a large number of subjects who are able to read and write independently. On the other hand, observation schedules were appropriate for this study because they effectively complemented the questionnaires and thus enhanced the quality of evidence available to the researcher. The data gathered can be highly reliable as the researcher was able to see the elements being studied like the number of fire fighting equipments.

#### **3.5.1 Instrument validity**

Mugenda and Mugenda (2003) define validity as the accuracy and meaningfulness of inferences which are based on the research results. Content validity in this research design was assured by careful choice of indicators which have informed the construction of the questionnaires. Validity was further enhanced by undertaking a pilot study prior to collecting the final data from the respondents. The part of the population (two schools) engaged in the validity test

were not involved in the final data collection exercise in order to avoid bias. In addition, validity was ensured through consulting research experts that is supervisors to ensure that the instruments of data collection can measure what they are intended to measure.

### 3.5.2 Instrument Reliability

Reliability is the tendency of an instrument to yield consistent results when applied on several occasions. The reliability of the questionnaires was tested through test- retest technique, data being collected with the instruments from a few selected subjects of the population at two different schools. Same respondents were given the questionnaire to fill two times with an in-between period of two weeks. Pearson product moment correlation was used to test reliability.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2] [n\sum y^2 - (\sum y)^2]}}$$

Where

x = results for first test       $\sum x^2$  = A summation of the square of first test results

y = results for second test       $\sum y^2$  = A summation of the square of second test results

$(\sum x)(\sum y)$  = A product of the summation of first and second test results

$n\sum x$  = Product of number of scores and summation of first test

$n\sum y$  = Product of number of scores and summation of second test

The positive correlation coefficient can range from 0.00 to 1.00. The closer to 1.00; the stronger the relationship is. The closer the scores are, the more reliable the research instrument is (Litwin, 1995). A correlation coefficient of 0.8 was established. This is an indication that the instruments were reliable.

### **3.6 Data Collection Procedure**

Before proceeding to collect data from the selected respondents the researcher first obtained a research permit to carry out the study in the area from the National Council of Science and Technology (NCST). This letter helped the researcher to access the schools. The researcher then visited the schools where the study would be carried out in order to create rapport. The questionnaires were administered to the respondents through drop and pick method. The filled questionnaires were picked one week later. The method was preferred because it allowed the respondents enough time to respond to the questionnaires.

### **3.7 Data Analysis Technique**

Data collected from respondents was analyzed through descriptive statistics. The process consisted of; editing which involved examination of raw data to detect errors and omissions in questionnaires and making corrections where possible; coding which involved assigning numerals to answers so that responses can be classified into a limited number of categories or classes appropriate to the research problem under consideration; classification which involved reducing the data into homogenous groups according to attributes or in class intervals and

tabulation which consisted of displaying the data in compact form. Descriptive statistics analysis of the data after processing involved frequencies and percentages. The results were presented in frequency tables. Data analysis was done with the help of Statistical Package of Social Sciences (SPSS).

## **CHAPTER FOUR**

### **DATA ANALYSIS, INTERPRETATION AND DISCUSSION**

#### **4.1 Introduction**

This chapter deals with data analysis, interpretation and presentation. The results are presented based on the objectives of the study. The data was analysed using descriptive statistics with the help of Statistical Package for Social Sciences (SPSS). The data analysed is presented using frequency tables. Interpretation of the findings is given.

#### **4.2 Questionnaire Return Rate**

The sample population constituted 9 principals, 56 teachers and 1124 students. All of them returned filled questionnaires. This implies that the response rate was 100%.

#### **4.3 Demographic information of the respondents**

This item sought for the head teachers and teachers' gender, working experience, highest academic qualifications and students' gender.

##### **4.3.1 Head teachers' teachers and students' gender**

The head teachers, teachers and students were asked to indicate their gender and the results are as summarised in Table 4.1

**Table 4.1 Distribution of H/T by gender**

<b>Principals' gender</b>	<b>Frequency</b>	<b>Percentage %</b>
Male	6	66.7
Female	3	33.3
<b>Total</b>	<b>9</b>	<b>100.0</b>

As shown in Table 4.1, most head teachers (66.7 percent) were male. This shows that there were more male principals than female principals. This could be because most institutions in Kenya are headed by males, schools included.

**Table 4.2 Distribution of teacher by gender**

<b>Teachers' gender</b>	<b>Frequency</b>	<b>Percentage %</b>
Male	22	39.3
Female	34	60.7
<b>Total</b>	<b>56</b>	<b>100.0</b>

According to Table 4.2, most teachers (60.7 percent) were female. The findings show that even if female teachers were more than male teachers, both genders among teachers were represented.



**Table 4.3 Distribution of students by gender**

<b>Students' gender</b>	<b>Frequency</b>	<b>Percentage %</b>
Male	558	49.6
Female	566	50.4
<b>Total</b>	<b>1124</b>	<b>100.0</b>

In relation to the students' gender, both genders were almost equally represented as shown in Table 4.3.

#### **4.3.2 Principals and teachers' teaching experience**

The principals and teachers were asked for how long they had been teaching and their responses are as summarised.

**Table 4.4 Principals teaching experience**

<b>Principals' teaching experience</b>	<b>Frequency</b>	<b>Percentage %</b>
0 - 5 years	2	22.2
Above 10 years	7	77.8
<b>Total</b>	<b>9</b>	<b>100.0</b>

As evidenced by Table 4.4, majority of the principals (77.8 percent) have taught for more than 10 years. When asked for how long the principal has been a head teacher, 22.2 percent said less than 5 years, 33.3 percent said between 6 and 10

years while 44.4 percent said above 10 years. This shows that most principals have led the school for more than 5 years hence understand issues to do with fire safety in the school well. When asked for how long they have served in the current school, 44.4 percent of the principals said less than 5, 33.3 percent said 6 to 10 years while the other 22.2 percent said more than 10 years. This means that most principals have been in the current station for long enough to understand fire disaster preparedness in the station.

**Table 4.5 Teachers’ working experience**

<b>Teaching experience</b>	<b>Frequency</b>	<b>Percentage %</b>
6 - 10 years	12	21.4
Above 10 years	44	78.6
<b>Total</b>	<b>56</b>	<b>100.0</b>

As shown in Table 4.5, most teachers (78.6%) have taught for more than 10 years. In their teaching experience in different schools, the teachers would be better placed to respond to issues related to fire disaster preparedness. Of the participating teachers, 60.7 percent have been in the current station for less than 5 years, 17.9 percent have been in the current station for 6 to 10 years while 21.4 percent have been there for more than 10 years. This is a long time for them to understand the level of fire disaster preparedness in their current school.

### 4.3.3 Head teachers' and teachers' highest academic qualification

This item sought for information about head teachers and teachers' highest academic qualifications and the results are as indicated in Table 4.6

**Table 4.6 Principals' highest academic qualifications**

<b>Principals' academic qualification</b>	<b>Frequency</b>	<b>Percentage %</b>
Degree	6	66.7
Masters	3	33.3
<b>Total</b>	<b>9</b>	<b>100.0</b>

As referenced in Table 4.6, majority of the principals (66.7 percent) reported that they have attained a bachelor's degree while the other 33.3 percent have master's degree. This shows that all head teachers who took part in the study are highly educated hence could understand fire disaster preparedness well.

**Table 4.7 Teachers' highest academic qualification**

<b>Teachers' academic qualification</b>	<b>Frequency</b>	<b>Percentage %</b>
Diploma	24	42.9
Degree	32	57.1
<b>Total</b>	<b>56</b>	<b>100.0</b>

In relation to their highest academic and professional qualification, 42.9 percent of the teachers had a diploma while 57.1 percent had a degree. This means that most teachers could understand fire disaster preparedness.

#### **4.4 Adequacy of fire fighting facilities for fire disasters within the school premises**

The first objective of the study was to establish the adequacy of fire fighting facilities for fire disasters within the schools premises in Nyeri Central District. In order to fulfil this objective, the several items were used as discussed in the following paragraphs

##### **4.4.1 Adequacy of fire fighting equipment**

The principals, teachers and students were asked whether the fire fighting equipment in their schools were adequate and they responded as shown below

**Table 4.8 Principals’ responses on adequacy of fire fighting equipment**

<b>Response</b>	<b>Frequency</b>	<b>Percentage %</b>
Adequate	1	11.1
Inadequate	8	88.9
<b>Total</b>	<b>9</b>	<b>100.0</b>

As shown in Table 4.8, most principals 88.9 percent said that they were not adequate. This implies that most schools do not have enough fire fighting equipment in case of a fire disaster. This shows lack of fire disaster preparedness.

**Table 4.9 Teachers’ responses on adequacy of fire fighting equipment**

<b>Response</b>	<b>Frequency</b>	<b>Percentage %</b>
Adequate	12	21.4
Inadequate	44	78.6
<b>Total</b>	<b>56</b>	<b>100.0</b>

As shown in Table 4.9, most teachers (78.6 percent) were of the opinion that the fire fighting equipment in their school was not adequate. This also shows a high level of fire disaster unpreparedness.

**Table 4.10 Students’ responses on adequacy of fire fighting equipment**

<b>Response</b>	<b>Frequency</b>	<b>Percentage %</b>
Adequate	227	20.2
Inadequate	897	79.8
<b>Total</b>	<b>1124</b>	<b>100.0</b>

As shown in Table 4.10, most students (79.8%) were of the opinion that the fire fighting equipment in their schools was inadequate. This shows that most schools

were not fully equipped to handle fire disaster. This is lack of preparedness in fire disaster management.

#### 4.4.2 Adequacy of specific fire fighting equipment

The principal, teachers and students were asked about the adequacy of specific fire fighting equipment and their responses are recorded Table 4.11

**Table 4.11 Principals' responses on adequacy of specific FFE**

Fire fighting equipment	Very adequate		Adequate		Inadequate		Very inadequate		Total %
	F	%	F	%	F	%	F	%	
Fire hydrants	0	0	0	0	6	66.7	3	33.3	100
Fire extinguishers	0	0	0	0	6	66.7	3	33.3	100
Fire-resistive materials	0	0	0	0	6	66.7	3	33.3	100
Fire exits	0	0	6	66.7	2	22.2	1	11.1	100
Fire protection devices	0	0	2	22.2	5	55.6	2	22.2	100
Fire blankets	0	0	0	0	4	44.4	5	55.6	100
Fire escape ladder	0	0	3	33.3	2	22.2	4	44.4	100
Heat/smoke detectors	0	0	1	11.1	2	22.2	6	66.7	100
Fire alarm	0	0	2	22.2	3	33.3	4	44.4	100
Fire hose and nozzles	0	0	0	0	2	22.2	7	77.8	100
Fire fighters' outfits	0	0	1	11.1	2	22.2	6	66.7	100
Fire sand bucket	0	0	3	33.3	0	0	6	66.7	100
Self contained breathing apparatus	0	0	2	22.2	0	0	7	77.8	100
Reliable water supply	2	22.2	7	77.8	0	0	0	0	100

As shown in Table 4.11, most principals indicated that specific fire fighting equipment was not adequate. The most adequate fire fighting equipment was reliable water supply and fire exits. The others were mainly inadequate or very inadequate. This was an indication that most schools are unprepared for fire disasters when it comes to adequate fire fighting equipment.

**Table 4.12 Teachers' responses on adequacy of specific FFE**

Fire fighting equipment	Very adequate		Adequate		Inadequate		Very inadequate		Total
	F	%	F	%	F	%	F	%	
Fire hydrants	22	39.3	10	17.9	12	21.4	12	21.4	100
Fire extinguishers	22	39.3	22	39.3	12	21.4	0	0	100
Fire-resistive materials	22	39.3	22	39.3	12	21.4	0	0	100
Fire exits	11	19.6	22	39.3	11	19.6	12	21.4	100
Fire protection devices	0	0	21	37.5	23	41.1	12	21.4	100
Fire blankets	0	0	22	39.3	22	39.3	12	21.4	100
Fire escape ladder	0	0	22	39.3	22	39.3	12	21.4	100
Heat/smoke detectors	10	17.9	0	0	34	60.7	12	21.4	100
Fire alarm	0	0	21	37.5	23	41.1	12	21.4	100
Fire hose and nozzles	0	0	0	0	44	78.6	12	21.4	100
Fire fighters' outfits	11	19.6	10	17.9	23	41.1	12	21.4	100
Fire sand bucket	0	0	22	39.3	22	39.3	12	21.4	100
Self contained breathing apparatus	0	0	0	0	44	78.6	12	21.4	100
Reliable water supply	44	78.6	12	21.4	0	0	0	0	100

As reflected in Table 4.12, majority of the teachers rated the specific fire fighting equipment as either inadequate or very inadequate. The fire fighting equipment which was more adequate according to teachers was fire hydrants, fire extinguishers and fire resistive materials. Reliable water supply was the most adequate fire fighting equipment. This is an indication that in case of a fire disaster, most schools would still be unprepared because they do not have adequate fire fighting equipment.

**Table 4.13 Students’ responses on adequacy of specific FFE**

Fire fighting equipment	Very adequate		Adequate		In adequate		Very inadequate		Total %
	F	%	F	%	F	%	F	%	
Fire hydrants	0	0	343	30.5	215	19.1	566	50.4	100
Fire extinguishers	0	0	458	40.7	451	40.1	215	19.1	100
Fire-resistive materials	0	0	112	10	343	30.5	669	59.5	100
Fire exits	564	50.2	225	20	335	29.8	0	0	100
Fire protection devices	0	0	339	30.2	559	49.7	226	20.1	100
Fire blankets	0	0	224	19.9	340	30.2	560	49.8	100
Fire escape ladder	0	0	0	0	564	50.2	560	49.8	100
Heat/smoke detectors	0	0	0	0	452	40.2	672	59.8	100
Fire alarm	115	10.2	0	0	336	29.9	673	59.9	100
Fire hose and nozzles	0	0	115	10.2	343	30.5	666	59.3	100
Fire fighters’ outfits	0	0	0	0	234	20.8	890	79.2	100
Fire sand bucket	0	0	0	0	346	30.8	778	69.2	100
Self contained breathing apparatus	0	0	0	0	115	10.2	1009	89.8	100
Reliable water supply	786	69.9	338	30.1	0	0	0	0	100



According to students' findings, most schools have inadequate equipment. The equipments which were more adequate were water supply, fire alarm, fire extinguishers and fire exits. These are not enough in case of a fire disaster. This shows that most schools have inadequate fire fighting equipment and the administration, staff, non-teaching staff and the students are still likely to suffer in case a fire broke out.

#### 4.4.2 Inspection of fire fighting equipment

When asked about how periodically fire fighting equipment are checked, the head teachers and teachers responded as shown in Table 4.14

**Table 4.14 Principals' responses on inspection of fire fighting equipment**

<b>Period</b>	<b>Frequency</b>	<b>Percentage %</b>
Once per term	2	22.2
Once per year	2	22.2
Once per every two years	2	22.2
Never	3	33.3
<b>Total</b>	<b>9</b>	<b>100.0</b>

As shown in Table 4.14, majority of the principals reported that the fire fighting equipment was inspected at most once per year. There were also a significant number of head teachers who reported that the fire fighting equipment was never inspected. This shows that in case of a fire disaster, even the head teachers might

not know whether the fire fighting equipment is still in a working condition because they are rarely inspected. This shows lack of fire disaster preparedness.

**Table 4.15 Teachers’ responses on inspection of fire fighting equipment**

<b>Period</b>	<b>Frequency</b>	<b>Percentage %</b>
Once per term	34	60.7
Once per year	22	39.3
<b>Total</b>	<b>56</b>	<b>100.0</b>

As far as teachers were concerned, fire fighting equipment are inspected once per term (60.7%) while the other teachers 39.3% said that they are inspected once per year. This implies that the teachers’ responses were contrary to the head teachers as teachers indicated that the fire fighting equipment were inspected more often.

#### **4.4.3 Fire fighting equipment to be added for better fire disaster preparedness**

Most of head teachers, teachers and students suggested an addition on fire exits, reliable water supply, fire extinguishers, smoke detectors, fire blankets, fire fighters outfits, fire protective clothing, fire hydrants, self contained breathing apparatus, fire escape ladder and fire hose and nozzles in order for schools to be better prepared for fire disasters.

#### 4.5 School buildings and fire safety

The second objective was to determine the extent to which school buildings are constructed in relation to policy provisions pertaining to fire disaster preparedness in Nyeri Central District. In an attempt to fulfil this objective, several items were used as discussed in the following paragraphs:

##### 4.5.1 Fire exits in the school buildings

The principals, teachers and students were asked whether there are fire exits in the school and they responded as shown in Table 4.16

**Table 4.16 Principals' responses on fire exits in the school buildings**

<b>Response</b>	<b>Frequency</b>	<b>Percentage %</b>
Yes and they are accessible to all	5	55.6
Yes but they are not easily accessible	4	44.4
<b>Total</b>	<b>9</b>	<b>100.0</b>

As evidenced in Table 4.16, all the head teachers accorded that the schools had fire exits. However, most head teachers (55.6 percent) were of the opinion that the fire exits were accessible to all but there was a significant number of head teachers (44.4 percent) who reported that the fire exits were not accessible to all. This implies that some schools were well prepared for fire disasters as far as accessible fire exits were concerned but others were not.

**Table 4.17 Teachers' responses on fire exits in the school buildings**

<b>Response</b>	<b>Frequency</b>	<b>Percentage %</b>
Yes and they are accessible to all	45	80.4
Yes but they are not easily accessible	11	19.6
<b>Total</b>	<b>56</b>	<b>100.0</b>

According to the teachers, 80.4 percent said there are fire exits in the school buildings and they are accessible to all while 19.6 percent said there are fire exits but they are not easily accessible. This implies that even if schools have fire exits, there are several schools whose fire exits are not accessible to the members of these schools. This still means that schools are not fully prepared in case of fire disaster.

**Table 4.18 Students' responses on fire exits in the school buildings**

<b>Response</b>	<b>Frequency</b>	<b>Percentage %</b>
Yes but they are not easily accessible	668	59.4
I don't know	119	10.6
No and there is no plan to have fire exits in the near future	337	30.0
<b>Total</b>	<b>1124</b>	<b>100.0</b>

As shown in Table 4.18, when asked whether there are fire-exits in the school, most students (59.4 percent) said yes but they are not easily accessible while a significant number (30.0 percent) said no and there is no plan in the near future. The implication is that even though there are fire exits in the schools, in case of a fire disaster the people in the schools may still suffer because they cannot access them. The fact that there is a significant number of students who do not know whether there are fire exits in the schools shows the lack of preparedness of the school in case of a fire disaster because even if they are there, the students do not know where such are. The findings also show that there are many schools which have no plan of fire exits in the near future. The implication is that school management in many schools are still not very seriously considering fire preparedness in schools.

#### 4.5.2 Aspects of school buildings and fire safety

The principals, teachers and students were asked to indicate their level of agreement in relation to different areas of school buildings and their fire safety.

Their responses are as summarised.

**Table 4.19 Principals' responses on areas of school buildings and fire safety**

Areas of school buildings	Strongly agree		Agree		Disagree		Strongly disagree		Total
	F	%	F	%	F	%	F	%	
Exits are clear of obstructions at all times	1	11.1	5	55.6	3	33.3	0	0	100
Fire extinguishers are placed in positions where they are easily accessible	2	22.2	2	22.2	2	22.2	3	33.3	100
Combustible materials have not been used for decorations	3	33.3	3	33.3	3	33.3	0	0	100
Windows in the school have not been grilled	2	22.2	3	33.3	2	22.2	2	22.2	100
Exit doors in buildings in the school swing outwards	4	44.4	1	11.1	2	22.2	2	22.2	100
Boarding facilities have not been designed to lock in students	2	22.2	4	44.4	2	22.2	1	11.1	100
Classes have been constructed in a way students and teachers can easily escape in case of fire	3	33.3	2	22.2	2	22.2	2	22.2	100
Halls have emergency doors and fire extinguishers	2	22.2	2	22.2	3	33.3	2	22.2	100
Laboratories have fire fighting equipment	0	0	4	44.4	2	22.2	3	33.3	100
Offices have fire fighting equipment	0	0	1	11.1	5	55.6	3	33.3	100
Kitchen has fire fighting equipment	0	0	2	22.2	4	44.4	3	33.3	100

According to Table 4.19, most principals indicated that windows in the school have not been grilled, exit doors in buildings in the school swing inwards, classes have been constructed in a way that students and teachers cannot easily escape in case of fire and halls have emergency doors and fire extinguishers but are not very accessible. The laboratory, kitchen and offices do not have fire fighting equipment according to the majority of the principals. These show that schools' levels of fire disaster preparedness were on the lower side.

**Table 4.20 Teachers' responses on areas of school buildings and fire safety**

Areas of school buildings	Strongly agree		Agree		Disagree		Strongly disagree		Total
	F	%	F	%	F	%	F	%	
Exits are clear of obstructions at all times	33	58.5	23	41.1	0	0	0	0	100
Fire extinguishers are placed in positions where they are easily accessible	22	39.3	34	60.7	0	0	0	0	100
Combustible materials have not been used for decorations	35	62.5	21	37.5	0	0	0	0	100
Windows in the school have not been grilled	34	60.7	12	21.4	10	17.9	0	0	100
Exit doors in buildings in the school swing outwards	44	78.6	12	21.4	0	0	0	0	100
Boarding facilities have not been designed to lock in students	44	78.6	12	21.4	0	0	0	0	100
Classes have been constructed in a way students and teachers can easily escape in case of fire	32	57.1	12	21.4	12	21.4	0	0	100
Halls have emergency doors and fire extinguishers	32	57.1	24	42.9	0	0	0	0	100
Laboratories have fire fighting equipment	32	57.1	24	42.9	0	0	0	0	100
Offices have fire fighting equipment	32	57.1	24	42.9	0	0	0	0	100
Kitchen has fire fighting equipment	44	78.6	12	21.4	0	0	0	0	100

As reflected in Table 4.20, most teachers were in agreement to the highlighted issues. Majority indicated that exits are clear of obstructions all the time, windows have not been grilled, exits doors in buildings swing outwards, boarding facilities have not been designed to lock in students. All these indicate that schools are well



prepared for fire disasters. The findings are contrary to the head teachers' findings which have shown a low level of fire disaster preparedness.

**Table 4.21 Students' responses on areas of school buildings and fire safety**

Areas of school buildings	Strongly agree		Agree		Disagree		Strongly disagree		Total
	F	%	F	%	F	%	F	%	
Exits are clear of obstructions at all times	115	10.5	225	20	672	59.8	112	10	100
Fire extinguishers are placed in positions where they are easily accessible	115	10.5	113	10.1	672	59.8	224	19.9	100
Combustible materials have not been used for decorations	684	60.9	225	20	103	9.2	112	10	100
Windows in the school have not been grilled	330	29.4	119	10.6	112	10	563	50.1	100
Exit doors in buildings in the school swing outwards	0	0	226	20.1	343	30.5	555	49.4	100
Boarding facilities have not been designed to lock in students	345	30.7	340	30.2	336	29.9	103	9.2	100
Classes have been constructed in a way students and teachers can easily escape in case of fire	0	0	228	20.3	457	40.7	439	39.1	100
Halls have emergency doors and fire extinguishers	0	0	231	20.6	451	40.1	442	39.3	100
Laboratories have fire fighting equipment	234	20.8 %	451	40.1	327	29.1	112	10	100
Offices have fire fighting equipment	345	30.7	449	39.9	330	29.4	0	0	100
Kitchen has fire fighting equipment	345	30.7	451	40.1	328	29.2	0	0	100

According to students' findings, most of them indicated that windows in the school have not been grilled, exit doors in buildings in the school swing inwards, classes have been constructed in a way that students and teachers cannot easily escape in case of fire and halls have emergency doors and fire extinguishers but

are not very accessible. These findings are in line with the researcher's observation because most classroom doors open inwards and fire extinguishers are placed on the walls but are too high to reach. However, in as far as the kitchen, offices and laboratories are concerned; most students indicated a high level of fire disaster preparedness. This shows that the school management prepares for fire disaster only in the areas where the risk is higher and where they feel that that damage would be very detrimental.

#### **4.5.3 Ways of improving school buildings to enhance fire disaster preparedness**

The head teachers, teachers and students suggested the following ways to improve fire disaster preparedness in relation to school buildings. Fire extinguishers should be easily accessible, windows should not be grilled, exits should be cleared of obstructions, fire extinguishers should be increased and doors should open outwards and increase in the size of doors.

#### **4.6 Fire safety plans and fire disaster preparedness**

The third objective: to establish how secondary schools have put in place fire safety plans as a measure of fire disaster preparedness in Nyeri Central District was fulfilled through the use of various items.

#### 4.6.1 Evacuation plans in the school

The head teachers, teachers and students were asked whether the school has evacuation plans in the event of fire disaster and they responded as discussed below

**Table 4.22 Principals' responses on evacuation plans in the school**

<b>Response</b>	<b>Frequency</b>	<b>percentage</b>
		<b>%</b>
Yes but it has never been used	1	11.1
Yes and it has been used	4	44.4
No but there is a plan that it will be made	4	44.4
<b>Total</b>	<b>9</b>	<b>100.0</b>

According to the principals' responses, majority of them (55.5 percent) indicated that the schools had an evacuation plan in case of a fire disaster. The ones that did not have evacuation plans reported that plans were in line to have such plans. This was an indication that principals are making efforts to improve fire disaster preparedness in schools.

**Table 4.23 Teachers' responses on evacuation plans in the school**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
		<b>%</b>
Yes but it has never been used	44	78.6
No and there is no plan that it will be made in the near future	12	21.4
<b>Total</b>	<b>56</b>	<b>100.0</b>

As shown in Table 4.23, majority (78.6 percent) said yes but it has never been used while 21.4 percent said no and there is no plan that it will be made in the near future. This means that most schools with evacuation have never used them. This is probably because most of the schools have not had fire disasters in the past. Evacuation plans come in handy when there is a fire disaster because the school administration can realise its need then. However, without a fire disaster in the past, most schools may not realise the importance of an emergency plan

**Table 4.24 Students' responses on evacuation plans in the school**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b> <b>%</b>
Yes but it has never been used	113	10.1
I don't know	673	59.9
No and there is no plan that it will be made in the near future	338	30.1
<b>Total</b>	<b>1124</b>	<b>100.0</b>

Of the students who took part in the study, majority (59.9 percent) said they do not know whether there is an evacuation plan and 30.1 percent said no and there is no plan that it will be made in the near future. The fact that most students were not aware of evacuation plans in the schools shows that in case of fire disaster, they may not benefit from the same. This is a sign of fire disaster unpreparedness.

#### **4.6.2 Effectiveness of emergency plans for fire disaster**

When asked on the effectiveness of the emergency plans for fire disaster, the head teachers, teachers and students responded as shown in table 4.25

**Table 4.25 Principals’ responses on effectiveness of emergency plans for fire disaster**

<b>Effectiveness</b>	<b>Frequency</b>	<b>Percentage</b>
		<b>%</b>
Effective	2	22.2
Moderately effective	4	44.4
Ineffective	2	22.2
Very ineffective	1	11.1
<b>Total</b>	<b>9</b>	<b>100.0</b>

As shown in Table 4.25, most principals reported that emergency plans in case of fire were at least moderately effective. This implies that even if schools have emergency plans, in case of a fire disaster, such plans may not effectively help them. This shows inadequate preparedness in fire disaster management.

**Table 4.26 Teachers’ responses on effectiveness of emergency plans for fire disaster**

<b>Effectiveness</b>	<b>Frequency</b>	<b>Percentage</b>
		<b>%</b>
Effective	22	39.3
Moderately effective	34	60.7
<b>Total</b>	<b>56</b>	<b>100.0</b>

Most teachers (60.7 percent) rated the emergency plans for fire disasters as moderately effective. This means that the emergency plans for fire disaster in schools are at most average in effectiveness. This shows lack of seriousness in fire disaster preparedness in schools.

**Table 4.27 Students’ responses on effectiveness of emergency plans for fire disaster**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
		<b>%</b>
Moderately effective	678	60.3
Ineffective	446	39.7
<b>Total</b>	<b>1124</b>	<b>100.0</b>

Of the students who took part in the study, majority (60.3 percent) reported that the emergency plans for fire disaster were moderately effective a significant number (39.7 percent) rated the emergency plans as ineffective. This is lack of fire disaster preparedness and it means that if schools are to be ready for fire disasters, they have to improve on the effectiveness of their emergency plans.

#### **4.6.3 Evacuation plans for vulnerable persons**

When asked whether the schools have evacuation plans for vulnerable persons, all the head teachers said no, all the teachers said no and 69(6.1 percent) of the students said yes while the other 93.9 percent said no. This is a clear indication



that most schools do not consider the physically challenged as far as fire disasters are concerned.

#### **4.6.4 Fire alert procedures**

When asked whether the schools have fire alert procedures, 33.3 percent of the head teachers said yes while 66.7 percent said no. Of the teachers who took part in the study 60.7 percent said yes while 39.3 percent said no. On the other hand 30.5 percent of the students said yes while the other 69.5 percent said no. The implication is that in most of the schools, if a fire broke out, the students, teachers and non teaching staff may not know what to do because of lack of fire alert procedures. This is lack of fire disaster preparedness.

#### **4.6.5 Number of assembly points in case of fire disaster**

When asked about how many assembly points the schools have in case of fire, the students responded as shown in Table 4.28

**Table 4.28 Principals’ responses on number of assembly points in case of fire disaster**

<b>Assembly points</b>	<b>Frequency</b>	<b>Percentage %</b>
None	7	77.8
Four	2	22.2
<b>Total</b>	<b>9</b>	<b>100.0</b>

Of the head teachers who took part in the study, 77.8 percent said there were no assembly points while 44.4 percent said there were assembly points. This implies that in most schools, the stakeholders would not know where to assemble in case a fire broke out. This shows lack of fire disaster preparedness.

#### **4.6.6 Times teachers and students are reminded of the evacuation plan**

When asked how often teachers, non teaching staff and students reminded of the evacuation plan, the head teachers, teachers and students responded as shown in Table 4.29

**Table 4.29 Principals’ responses on reminders for evacuation plan**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
		<b>%</b>
Yearly	2	22.2
Half yearly	1	11.1
Never	6	66.7
<b>Total</b>	<b>9</b>	<b>100.0</b>

When asked about how often teachers, non-teaching staff and students are reminded of the evacuation plan; majority of the head teachers (66.7%) said never, 22.2 percent of the head teachers said yearly and 11.1 percent said half yearly. The implication is that even if schools have evacuation plans, they might

not help school stakeholders in case of a fire disaster because they are rarely reminded of the same.

#### **4.6.7 Improving fire safety plans for better fire disaster preparedness**

The head teachers, teachers and students were asked about the ways of improving fire safety plans for better fire disaster preparedness and they suggested that they should be made aware of evacuation plans, all stakeholders should be reminded of evacuation plan, assembly points should be identified and stakeholders notified, schools should have fire alert procedures and schools should have many assembly points in case of a fire.

#### **4.7 Training on fire safety**

The fourth objective was to determine whether secondary schools train teachers, workers and students on appropriate responses in case of fire in Nyeri Central District. In an attempt to meet this objective, several items were used as discussed below.

##### **4.7.1 Teachers and students training on fire safety**

On whether the members of the staff have been trained on fire safety, majority of the head teachers (77.8%) said no while 22.2 percent of the head teachers said yes. Of the teachers who took part in the study, most of them (60.7%) said no while 39.3 percent reported that the members of staff have been trained. On

whether the students have been trained or equipped to fight a fire, all the students said no.

#### **4.7.2 Reasons for training on fire safety**

Of the principals who took part in the study, majority (78.8 percent) said that teachers and students were not trained on fire safety while 22.2 percent reported that teachers are trained on fire safety because fire disaster can occur at any time. The head teachers who said they have not trained their members of staff said that there has never been a need to train them (22.2 percent) while 22.2 percent said there are no materials to teach them with and 11.1 percent said that there has never been a plan to train them but now there will be. The teachers reported that the training on fire safety is done because it is required by the ministry of education while the reasons for not training were that there has never been a need to train them (42.9 percent) and that, education officers do not check (17.9 percent). Of the students who participated in the study, 50.5 percent said that there has never been a need to train them, 39.4 percent said that there are no materials to teach them with while 39.4 percent gave others reasons. This shows that school managers have not yet taken the issue of fire safety to the teachers and students' level. Given that in most of fire disasters in schools are in the dormitories and at night, it would only be prudent to train the students on fire safety. Failure to do that is a sure sign of fire disaster unpreparedness.

#### 4.7.4 Training of specific school stakeholders on fire safety

When asked about the training of specific school stakeholders, the principals, teachers and students responded as follows

**Table 4.30 Principals' responses on training of specific school stakeholders on fire safety**

Training on fire safety	Strongly agree		Agree		Disagree		Strongly disagree		Total
	F	%	F	%	F	%	F	%	
Students in the school have been trained to fight fire	0	0	4	44.4	0	0	5	55.6	100
New teaching and non-teaching staff members taken around the primary escape routes of the school	0	0	3	33.3	1	11.1	5	55.6	100
Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire	0	0	2	22.2	2	22.2	5	55.6	100
Head teacher is well trained in fire disaster management	0	0	2	22.2	4	44.4	3	33.3	100
Teachers are adequately trained in fire disaster management	0	0	0	0	6	66.7	3	33.3	100
Kitchen staffs are well trained in fire disaster management	0	0	0	0	4	44.4	5	55.6	100
Lab technicians are well trained in fire disaster management	0	0	4	44.4	3	33.3	2	22.2	100
School drivers are trained in fire disaster management	0	0	3	33.3	3	33.3	3	33.3	100
School security personnel are well trained in fire disaster management	0	0	0	0	6	66.7	3	33.3	100
School nurse is well trained in fire disaster management	0	0	3	33.3	4	44.4	2	22.2	100

The findings in Table 4.30 showed that students, teachers and the non teaching staffs have not been trained on fire safety. In most schools, new teaching and non-teaching staff members were not taken around the primary escape routes of the school and most schools did not provide new individuals in the school with a personal copy of prepared written instructions on what to do in case of a fire. Failure to train the teachers, non-teaching staffs and students on fire safety shows fire disaster unpreparedness.

#### **4.7.3 Ways of improving training in fire safety in schools**

The head teachers, teachers and students suggested that as way to improve training in fire safety, all stakeholders should be trained in fire safety. They should also be trained on how to use the fire equipment in school in case of a fire disaster. All stakeholders should also be trained on how to handle fire casualties. Fire fighting experts should also be invited in schools to talk to the stakeholders on fire disaster management.

#### 4.8 Results of observation schedule

The results of the observation schedule are as summarised in Table 4.31

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**Table 4.31 Results of observation schedule**

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Particulars	Details per school
Number of teachers, workers and students	Teachers 20-34 workers 9-22 students 300-634
Number of fire fighting equipment	Less than 13
Fire fighting equipment in working condition	Less than 13
Types of fire fighting equipment	Extinguishers, fire alarms
Number of buildings	Between 8 and 55
Number of fire exits per building	One to three exits
Number of emergency doors per building	None or one
Number of copies of fire safety plans	None or one
Number of people with fire safety plans	None or one
Number of trained people on fire safety	Less than three
Number of people who can do first aid in case of fire	Between one and 150
Fire safety procedure	None or one

As shown in Table 4.31, most schools had 20 to 34 teachers, 9 to 22 workers and 300 to 634 students. However, despite the number of people in the schools, the number of fire fighting equipment was low with most schools having 5 while the ones with the most fire fighting equipment had 13. This is not proportional to the number of people in the schools. Out of the fire fighting equipment in a school, 3 on the lower side and 13 on the higher side are in working condition. This implies that there are school with fire fighting equipment which are not in a working condition and this shows fire disaster unpreparedness. The most mentioned fire fighting equipment in schools is fire extinguishers and fire alarms. The number of buildings in the schools ranged between 8 and 55 while the number of fire exits per building was 1 to 3. The number of emergency doors per building was either none or 1. Most schools had no copies of fire safety plans and the ones that had most copies had only one. The number of trained people on fire safety was 3 per school at most. This is a very high level of fire disaster unpreparedness. The number of people who can do first aid in case of fire were less than 5 in most schools. However, one school 150 people in the school who could do first aid as a result of being trained by St. John's community. Most schools had no fire safety procedure and the ones which had, had only one. According to the observation schedule, most schools are not fully equipped to deal with fire disaster. This is in terms of fire fighting equipment, safety plans and skills. This implies that most school in Nyeri Central District are not prepared in case of fire disasters.



## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents summary, conclusions and recommendations of the study as well as suggestions for further study.

#### **5.2 Summary of the Study**

It has emerged that most schools in Kenya have no capacity to handle emergencies like fire, and are yet to even implement safety standards manual produced in 2008 by the ministry of education. In Nyeri Central District, school fire disasters have been reported in Nyeri high School, Giakanja Boys Secondary School and Endarasha High School among others. Fires in schools are a public concern because of the increased incidences, injuries and deaths of students not to mention the destruction of property. Even if schools may face other problems like strikes and indiscipline, these rarely result into deaths like fire disasters. From the literature in the background, it is clear that schools seem not well prepared for fire disasters. Without fire preparedness, schools will continue to lose lives, property and learning time. It was therefore important to carry out a study on fire disaster preparedness in secondary schools in Nyeri Central District, Kenya.

The study was guided by the following objectives: to establish the adequacy of fire fighting facilities for fire disasters within the school premises; to determine how school buildings are built in accordance with policy provisions pertaining

fire disaster preparedness; to examine how secondary schools have put in place fire safety plans as a measure of fire disaster preparedness and to establish how secondary schools train teachers, workers and students on appropriate responses in case of fire. The research adopted a descriptive survey. The target population for this study consisted of the 18 public secondary schools in Nyeri Central District with 18 principals, 281 teachers and 11,240 students. This study employed stratified sampling technique to obtain the sample population of 9 principals, 56 teachers and 1124 students. Data was collected by means of questionnaires administered to the principals, teachers and learners of the sampled schools and an observation schedule. Data collected from respondents was analyzed through descriptive statistics. The results were presented using frequency tables and the findings are as discussed in the following paragraphs:

### **5.3 Major findings of the Study**

According to the findings of the first objective which was to establish the adequacy of fire fighting facilities for fire disasters within the school premises; majority of the head teachers, teachers and students reported that the fire fighting equipment in schools is inadequate. The equipments which were more adequate were water supply, fire alarm, fire extinguishers and fire exits. These are not enough in case of a fire disaster. This shows that most schools have inadequate fire fighting equipment and the administration, staff, non-teaching staff and the students are still likely to suffer in case a fire broke out. This is in line with Ians'

(2010) study in India. In addition, the fire fighting equipment is not proportional to the teachers and students population as supported by Mwenga (2008) and Lucheli and Masese (2009). The findings also showed the fire fighting equipment is rarely inspected. This shows that in case of a fire disaster, even the school stakeholders might not know whether the fire fighting equipment is still in a working condition because they are rarely inspected. This is supported by Akali, Khabamba and Muyinga (2009) who found out that fire fighting equipment is rarely inspected or serviced. This shows lack of fire disaster preparedness.

The second objective was to determine the extent to which school buildings are constructed in relation to policy provisions pertaining to fire disaster preparedness. It was found out that fire exits are there but most respondents reported that they are not easily accessible meaning that they might still not help them in case of a fire disaster. Most respondents reported that there are fire extinguishers but their inaccessibility may not help the students, teachers or non-teaching staff in case of a fire disaster. Most schools have not used combustible materials for decorations which is a positive when it comes to fire disaster preparedness. In addition, most schools have taken caution as far as grilling of windows in concerned and this is a sign of fire preparedness. This is supported by Marion and Maingi (2010). Most doors in school buildings swing inwards which is very dangerous in case of a fire disaster inside the buildings. In majority of the schools, the boarding facilities have been designed in a way that they cannot lock

students inside in case of fire but this is not the case as far as classrooms are concerned. This is in line with Oduor's (2012) study. Most schools halls also lack emergency doors and fire extinguishers. However, in as far as the kitchen, offices and laboratories are concerned, most head teachers and teachers indicated a high level of fire disaster preparedness.

Findings on the third objective which was to establish how secondary schools have put in place fire safety plans as a measure of fire disaster preparedness showed that majority of schools have evacuation plans but they have never used them. Having such plans is supported by White (2011) who highlighted that fire safety plans are important as they increase the level of preparedness in case of a fire disaster. However, in the schools in Nyeri Central District, such plans have never been used. This means that school stakeholders may not benefit from evacuation plans and this is a sign of fire unpreparedness. On their effectiveness, majority of the respondents reported that emergency plans for fire disaster in schools are at most average. Majority of the respondents accorded that they do not have fire alert procedures. This is in line with Nakitto and Lett (2012) who found out that; schools in Uganda had to fire safety plans. However, it is contrary to White (2011) who highlighted that schools should have fire safety plans outlining what should be done in case of a fire disaster. The implication is that in most of the schools, if a fire broke out, the students, teachers and non teaching staff may not know what to do because of lack of fire alert procedures. The findings also show that most schools have only assembly one point while the majority have

none. As far as evacuation plans are concerned, most schools do not remind the immediate stakeholders of the plans may mean that the plans may not help them in case of a fire disaster. This shows ill-preparedness in case of a fire disaster as supported by Ndiang'ui (2006).

The fourth objective was to determine whether secondary schools train teachers, workers and students on appropriate responses in case of fire. Findings on this objective showed that most members of staff and all students have not been trained. This is in line with Makhanu's (2009) and Kukali's (2009) findings. The reason for training is that because fire disaster can occur at any time and that because it is required by the ministry of education. The reasons for not training are that there has never been a need to train on fire safety and there are no materials to teach with. This means that school management in most schools wait for fire disasters to occur so that they can prepare themselves which is very dangerous. Majority of schools do not have having some individuals in the school personal copy of prepared written instructions on what to do in case of a fire. Of the school stakeholders trained on fire safety are laboratory technicians, school security and school nurse. However, majority of the other stakeholders are not trained. All these show that school stakeholders lack in the necessary skills of fire disaster management and hence in case of a fire disaster, most of them may not know what to do. This is lack of fire disaster preparedness.

#### **5.4 Conclusion of the Study**

Based on the findings of the first objective, the fire fighting equipment in most schools is inadequate. The fire fighting equipment available in most schools is fire extinguishers, fire alarms and fire exits. The other fire fighting equipments are very inadequate and the head teachers, teachers and students proposed that they should be added. In addition, the fire fighting equipment is rarely inspected meaning that they might be out of working condition. It can therefore be concluded that schools' fire fighting equipment are inadequate contributing to fire disaster unpreparedness.

Findings on the second objective showed that the kitchen, laboratory and offices have the necessary equipment for fire disaster. However, fire extinguishers were found not to be accessible; exits are there but have obstructions and classroom doors mostly and inwards. It can therefore be concluded that schools have made effort to improve fire disaster preparedness but their preparedness is still poor and needs to be improved.

Based on the findings on the third objective, it can be concluded that most schools are not prepared in fire disaster management because most of them have evacuation plans which they have never used. Emergency plans for fire disaster in schools are at most average. Most schools lack fire alert procedures. Most schools have only one assembly point while the majority have none. Most schools do not

remind the immediate stakeholders of the plans may mean that the plans may not help them in case of a fire disaster.

Based on the findings on the fourth objective, school stakeholders are not trained on fire safety because there has never been a need to train on fire safety and there are no materials to teach with. Majority of schools do not have individuals in the school with a personal copy of written instructions on what to do in case of a fire disaster. It can therefore be concluded that schools are not well prepared in fire disaster management because the most school stakeholders are not trained in the same.

### **5.5 Recommendations from the Study**

The researcher recommends the following:

- i) Based on the findings from the first objective, the school management should consider adding the fire fighting equipment like fire exits, reliable water supply, fire extinguishers, smoke detectors, fire blankets, fire fighters outfits, fire protective clothing, fire hydrants, self contained breathing apparatus, fire escape ladder and fire hose and nozzles so that they become adequate and proportional to the number of buildings and people in the schools. It is also recommended that the fire fighting equipment in schools should be inspected more often to ensure that they are always in a working condition.

- ii) Based on the findings from the second objective, it is recommended that fire extinguishers should be easily accessible, windows should not be grilled, exits should be cleared of obstructions, fire extinguishers should be increased and doors should open outwards.
- iii) Based on the findings from the third objective, it is recommended that head teachers, teachers and students should be made aware of evacuation plans, all stakeholders should be reminded of evacuation plan, assembly points should be identified and school stakeholders notified, schools should have fire alert procedures and schools should have many assembly points in case of a fire.
- iv) Based on the findings from the fourth objective, it is recommended that all stakeholders should be trained in the same. They should as well be trained on how to use the fire equipment in school in case of a fire disaster. All stakeholders should also be trained on how to handle fire casualties. Fire fighting experts should also be invited in schools to talk to the stakeholders on fire disaster management.

## **5.6 Suggestions for further study**

The researcher suggests that:

- i) A similar study should be done in other areas in Kenya to check on fire disaster preparedness in schools as cases of fire disasters are on the rise in Kenya.



- ii) There should be a comparative study on fire disaster preparedness in the private and public schools in Kenya.
- iii) A study to establish the level of risk of fire disasters in schools in Kenya should also do carried out.

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**APPENDICES**

**APPENDIX A: INTRODUCTION LETTER**

Gichuru, Jacqueline Ngema

P.O Box 575,

Nyeri

Cell phone: 0722664643

To .....

Dear Sir or Madam,

**REF: REQUEST FOR PARTICIPATION IN RESEARCH STUDY**

I am a final year Master of Education student in university of Nairobi. I am specializing in education in emergencies. I am currently undertaking research study on the level of fire disaster preparedness in secondary schools in Nyeri Central District

I would be grateful if you could spare some time and complete the enclosed questionnaire. Your identity will be treated with utmost confidentiality. Your timely response will be highly appreciated.

Yours faithfully,

-----

Gichuru, Jacqueline Ngema

## APPENDIX B: QUESTIONNAIRE FOR TEACHERS

I am Jackline Ngema Gichuru, a final year student in the University of Nairobi. I am carrying out a study on the level of fire disaster preparedness in schools in Nyeri Central District. The information collected will help to gauge the level of preparedness in fire disasters in schools. Kindly respond honestly and accurately to questions listed below. Your identity will be treated with utmost confidence and the information collected will not be used for any other purpose other than which pertains to this research.

### Section I: Demographic information

Please provide the information about you and your school. Tick appropriately

(  ).

1. Please indicate your gender

Male (  )

Female (  )

2. For how long have you been a teacher?

0-5yrs (  )

6-10yrs (  )

Above 10yrs (  )

3. For how long have you served in the current station?

0-5yrs (  )

6-10yrs (  )

Above 10yrs (  )

4. Kindly tick your academic and professional qualifications as applicable below.

Certificate (  )

Diploma (  )

Degree (  )

Masters (  )

Others (  )

5. What category is your school? Tick as appropriate.

National ( )

County ( )

District ( )

**Section II: Fire fighting equipment**

6. Are the fire fighting equipment in your school adequate?

Yes ( )      No ( )      I don't know ( )

7. Kindly indicate the level of adequacy of the following fire fighting equipment in your school

Fire fighting equipment	Very adequate	Adequate	Inadequate	Very inadequate
Fire hydrants				
Fire extinguishers				
Fire-resistive materials				
Fire exits				
Fire protection devices				
Fire blankets				
Fire escape ladder				
Heat/smoke detectors				
Fire alarm				
Fire hose and nozzles				
Fire fighters' outfits				
Fire sand bucket				
Self contained breathing apparatus				
Reliable water supply				



8. How periodically is fire fighting equipment inspected?

Once per term ( )    Once per year ( )    Once every two years ( )

Never ( )

9. Kindly suggest three fire fighting equipment which need to be added in the school

I to improve fire preparedness in terms of adequacy of fire fighting equipment

.....

**Section III: School buildings and fire safety**

10. Are there fire exits in your school?

Yes and they are accessible to all ( )

Yes but they are not easily accessible ( )

I don't know ( )

No but there is a plan that they will be installed ( )

No and there is no plan in the near future for their installation ( )

11. Kindly indicate your level of agreement to the following statements in relation to school buildings and fire safety where: Strongly Agree = SA, Agree = A, Disagree = D and Strongly Disagree = SD

Statement	SA	A	D	SD
Exits are clear of obstructions at all times				
Fire extinguishers are placed in positions where they are easily accessible				
Combustible materials have not been used for decorations				
Windows in the school have not been grilled				
Exit doors in buildings in the school swing outwards				
Boarding facilities have not been designed to lock in students				
Classes have been constructed in a way students and teachers can easily escape in case of fire				
Halls have emergency doors and fire extinguishers				
Laboratories have fire fighting equipment				
Offices have fire fighting equipment				
Kitchen has fire fighting equipment				

12. Please suggest three ways in which the school buildings can be improved as a strategy for ensuring fire safety

.....

**Section IV: Fire safety plans**

13. Does your school have an evacuation plan in the event of fire?

Yes but it has never been used ( )

Yes and it has ever been used ( )

I don't know ( )

No but there is a plan that it will be made ( )

No and there is no plan that it will be made in the near future ( )

14. How effective are the emergency plans for fire disaster in your school?

Very effective ( ) Effective ( ) Moderately effective ( ) Ineffective ( )

Very ineffective ( )

15. Does your school have evacuation plans for vulnerable persons (e.g. physically disable persons) in case of fire Yes ( ) No ( )

16. Does your school have fire alert procedures? Yes ( ) No ( )

17. How many assembly points does your school have in case of fire?

None ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

18. How often are the teachers, non-teaching staff and students reminded of the evacuation plan in case of fire?

Yearly ( ) Half yearly ( ) Per term ( ) Monthly ( ) Weekly ( )

Never ( )

19. Kindly propose three ways fire safety plans should be improved in your school

.....

**Section V: Training on fire safety**

20. a) Have members of your teaching and non teaching staff been trained or equipped to fight a fire? Yes ( ) No ( )

b) If yes in (a) above, give main reason

Fire disaster can occur any time ( )

It's a preventive measure to avoid damage, injuries and death ( )

It is required by the ministry of education ( )

Educators feel safer when the staffs are trained on fire safety ( )

Any other (specify).....

c) If no in (a) above, tick the most applicable response

There has never been a need to train them ( )

Education officers do not check ( )

There are no materials to teach them with ( )

They are not willing to be taught ( )

Any other (specify).....

21. Kindly indicate your level of agreement to the following statements in relation to training in fire disaster management where: Strongly Agree = SA, Agree = A, Disagree = D and Strongly Disagree = SD

Statement	SA	A	D	SD
Students in the school have been trained to fight fire				
New teaching and non-teaching staff members taken around the primary escape routes of the school				
Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire				
Head teacher is well trained in fire disaster management				
Teachers are adequately trained in fire disaster management				
Kitchen staffs are well trained in fire disaster management				
Lab technicians are well trained in fire disaster management				
School drivers are trained in fire disaster management				
School security personnel are well trained in fire disaster management				
School nurse is well trained in fire disaster management				

22. Propose three ways in which training on fire safety can be improved

.....

## APPENDIX C: QUESTIONNAIRE FOR STUDENTS

I am Jackline Ngema Gichuru, a final year student in the University of Nairobi. I am carrying out a study on the level of fire disaster preparedness in schools in Nyeri Central District. The information collected will help to gauge the level of preparedness in fire disasters in schools. Kindly respond honestly and accurately to questions listed below. Your identity will be treated with utmost confidence and the information collected will not be used for any other purpose other than which pertains to this research.

### Section I: Demographic information

Please provide the information about you and your school. Tick appropriately

(  ).

1. Please indicate your gender

Male (  )

Female (  )

2. Kindly indicate your form

Form 1 (  ) Form 2 (  ) Form 3 (  ) Form 4 (  )

3. For how long have you been in the school?

Less than 1 year (  ) 2 years (  ) 3 years (  ) 4 years (  )

4. What category is your school? Tick as appropriate.

National ( )

County ( )

District ( )

**Section II: Fire fighting equipment**

5. Are the fire fighting equipment in your school adequate?

Yes ( )      No ( )      I don't know ( )



6. Kindly indicate the level of adequacy of the following fire fighting equipment in your school

Fire fighting equipment	Very adequate	Adequate	Inadequate	Very inadequate
Fire hydrants				
Fire extinguishers				
Fire-resistive materials				
Fire exits				
Fire protection devices				
Fire blankets				
Fire escape ladder				
Heat/smoke detectors				
Fire alarm				
Fire hose and nozzles				
Fire fighters' outfits				
Fire sand bucket				
Self contained breathing apparatus				
Reliable water supply				

7. Kindly suggest three fire fighting equipment which need to be added in the school to improve fire preparedness in terms of adequacy of fire fighting equipment

.....

**Section III: School buildings and fire safety**

8. Are there fire exits in your school?

Yes and they are accessible to all ( )

Yes but they are not easily accessible ( )

I don't know ( )

No but there is a plan that they will be installed ( )

No and there is no plan in the near future for their installation ( )

9. Kindly indicate your level of agreement to the following statements in relation to school buildings and fire safety where: Strongly Agree = SA, Agree = A, Disagree = D and Strongly Disagree = SD

Statement	SA	A	D	SD
Exits are clear of obstructions at all times				
Fire extinguishers are placed in positions where they are easily accessible				
Combustible materials have not been used for decorations				
Windows in the school have not been grilled				
Exit doors in buildings in the school swing outwards				
Boarding facilities have not been designed to lock in students				
Classes have been constructed in a way students and teachers can easily escape in case of fire				
Halls have emergency doors and fire extinguishers				
Laboratories have fire fighting equipment				
Offices have fire fighting equipment				
Kitchen has fire fighting equipment				

10. Please suggest three ways in which the school buildings can be improved as a strategy for ensuring fire safety

.....

**Section IV: Fire safety plans**

11. Does your school have an evacuation plan in the event of fire?

Yes but it has never been used ( )

Yes and it has ever been used ( )

I don't know ( )

No but there is a plan that it will be made ( )

No and there is no plan that it will be made in the near future ( )

12. How effective are the emergency plans for fire disaster in your school?

Very effective ( ) Effective ( ) Moderately effective ( ) Ineffective ( )

Very ineffective ( )

13. Does your school have evacuation plans for vulnerable persons (e.g. physically disable persons) in case of fire Yes ( ) No ( )

14. Does your school have fire alert procedures? Yes ( ) No ( )

15. How many assembly points does your school have in case of fire?

None ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

16. How often are the teachers, non-teaching staff and students reminded of the evacuation plan in case of fire?

Yearly ( ) Half yearly ( ) Per term ( ) Monthly ( ) Weekly ( )

Never ( )

17. Kindly propose three ways fire safety plans should be improved in your school

.....

**Section V: Training on fire safety**

18. a) Have students been trained or equipped to fight a fire? Yes ( ) No ( )

b) If yes in (a) above, give main reason

Fire disaster can occur any time ( )

It's a preventive measure to avoid damage, injuries and death ( )

It is required by the ministry of education ( )

Educators feel safer when the staffs are trained on fire safety ( )

Any other (specify).....

c) If no in (a) above, tick the most applicable response

There has never been a need to train them ( )

Education officers do not check ( )

There are no materials to teach them with ( )

They are not willing to be taught ( )

Any other (specify).....

19. Kindly indicate your level of agreement to the following statements in relation to training in fire disaster management where: Strongly Agree = SA, Agree = A, Disagree = D and Strongly Disagree = SD

Statement	SA	A	D	SD
Students in the school have been trained to fight fire				
New teaching and non-teaching staff members taken around the primary escape routes of the school				
Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire				
Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire				
Teachers are adequately trained in fire disaster management				
Kitchen staffs are well trained in fire disaster management				
Lab technicians are well trained in fire disaster management				
School drivers are trained in fire disaster management				
School security personnel are well trained in fire disaster management				
School nurse is well trained in fire disaster management				

20. Propose three ways in which training on fire safety can be improved

.....

## APPENDIX D: QUESTIONNAIRE FOR PRINCIPALS

I am Jackline Ngema Gichuru, a final year student in the University of Nairobi. I am carrying out a study on the level of fire disaster preparedness in schools in Nyeri Central District. The information collected will help to gauge the level of preparedness in fire disasters in schools. Kindly respond honestly and accurately to questions listed below. **Section I: Demographic information**

1. What is your gender?

Male (    )

Female (    )

2. How long is your teaching experience?

0-5yrs (    )

6-10yrs (    )

Above 10yrs (    )

3. For how long have you been a head teacher?

0-5yrs (    )

6-10yrs (    )

Above 10yrs (    )

4. For how long have you served in the current station?

0-5yrs (    )

6-10yrs (    )

Above 10yrs (    )

5. What is your highest academic and professional qualification?

Certificate (    )

Diploma (    )

Degree (    )

Masters (    )

Others (    )

6. What category is your school?

National ( ) County ( ) District ( )

**Section II: Fire fighting equipment**

7. Are the fire fighting equipment in your school adequate?

Yes ( ) No ( ) I don't know ( )

8. Kindly indicate the level of adequacy of the following fire fighting equipment in your school

Fire fighting equipment	Very adequate	Adequate	Inadequate	Very inadequate
Fire hydrants				
Fire extinguishers				
Fire-resistive materials				
Fire exits				
Fire protection devices				
Fire blankets				
Fire escape ladder				
Heat/smoke detectors				
Fire alarm				
Fire hose and nozzles				
Fire fighters' outfits				
Fire sand bucket				
Self contained breathing apparatus				
Reliable water supply				

9. How periodically is fire fighting equipment inspected?

Once per term ( ) Once per year ( ) Once every two years ( )

Never ( )



10. Kindly suggest three fire fighting equipment which need to be added in the school to improve fire preparedness in terms of adequacy of fire fighting equipment

.....

**Section III: School buildings and fire safety**

11. Are there fire exits in your school?

Yes and they are accessible to all ( )

Yes but they are not easily accessible ( )

I don't know ( )

No but there is a plan that they will be installed ( )

No and there is no plan in the near future for their installation ( )

12. Kindly indicate your level of agreement to the following statements in relation to school buildings and fire safety where: Strongly Agree = SA, Agree = A, Disagree = D and Strongly Disagree = SD

Statement	SA	A	D	SD
Exits are clear of obstructions at all times				
Fire extinguishers are placed in positions where they are easily accessible				
Combustible materials have not been used for decorations				
Windows in the school have not been grilled				
Exit doors in buildings in the school swing outwards				
Boarding facilities have not been designed to lock in students				
Classes have been constructed in a way students and teachers can easily escape in case of fire				
Halls have emergency doors and fire extinguishers				
Laboratories have fire fighting equipment				
Offices have fire fighting equipment				
Kitchen has fire fighting equipment				

13. Please suggest three ways in which the school buildings can be improved as a strategy for ensuring fire safety

.....

**Section IV: Fire safety plans**

14. Does your school have an evacuation plan in the event of fire?

Yes but it has never been used ( )

Yes and it has ever been used ( )

I don't know ( )

No but there is a plan that it will be made ( )

No and there is no plan that it will be made in the near future ( )

15. How effective are the emergency plans for fire disaster in your school?

Very effective ( ) Effective ( ) Moderately effective ( ) Ineffective ( )

Very ineffective ( )

16. Does your school have evacuation plans for vulnerable persons (e.g. physically disable persons) in case of fire Yes ( ) No ( )

17. Does your school have fire alert procedures? Yes ( ) No ( )

18. How many assembly points does your school have in case of fire?

None ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

19. How often are the teachers, non-teaching staff and students reminded of the evacuation plan in case of fire?

Yearly ( ) Half yearly ( ) Per term ( ) Monthly ( ) Weekly ( )

Never ( )

20. Kindly propose three ways fire safety plans should be improved in your school

.....

**Section V: Training on fire safety**

21. a) Have members of your teaching and non teaching staff been trained or equipped to fight a fire? Yes ( ) No ( )

b) If yes in (a) above, give main reason

Fire disaster can occur any time ( )

It's a preventive measure to avoid damage, injuries and death ( )

It is required by the ministry of education ( )

Educators feel safer when the staffs are trained on fire safety ( )

Any other (specify).....

c) If no in (a) above, tick the most applicable response

There has never been a need to train them ( )

Education officers do not check ( )

There are no materials to teach them with ( )

They are not willing to be taught ( )

Any other (specify).....

22. Kindly indicate your level of agreement to the following statements in relation to training in fire disaster management where: Strongly Agree = SA, Agree = A, Disagree = D and Strongly Disagree = SD

Statement	SA	A	D	SD
Students in the school have been trained to fight fire				
New teaching and non-teaching staff members taken around the primary escape routes of the school				
Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire				
Head teacher is well trained in fire disaster management				
Teachers are adequately trained in fire disaster management				
Kitchen staffs are well trained in fire disaster management				
Lab technicians are well trained in fire disaster management				
School drivers are trained in fire disaster management				
School security personnel are well trained in fire disaster management				
School nurse is well trained in fire disaster management				

23. Propose three ways in which training on fire safety can be improved

.....

**APPENDIX E: OBSERVATION SCHEDULE**

Details	Details
Number of teachers, workers and students	
Number of fire fighting equipment	
Fire fighting equipment in working condition	
Types of fire fighting equipment	
Number of buildings	
Number of fire exits per building	
Number of emergency doors per building	
Number of copies of fire safety plans	
Number of people with fire safety plans	
Number of trained people on fire safety	
Number of people who can do first aid in case of fire	
Fire safety procedure	

REPUBLIC OF KENYA



## NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

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NAIROBI-KENYA  
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/14/013/639**

Date: **13<sup>th</sup> May, 2013**

Jacqueline Ngema Gichuru  
University of Nairobi  
P.O.Box 30197-00100  
Nairobi.

### **RE: RESEARCH AUTHORIZATION**

Following your application dated **26<sup>th</sup> April, 2013** for authority to carry out research on "**Fire Disaster preparedness strategies in Secondary Schools in Nyeri Central District, Kenya.**" I am pleased to inform you that you have been authorized to undertake research in **Nyeri District** for a period ending **31<sup>st</sup> May, 2014.**

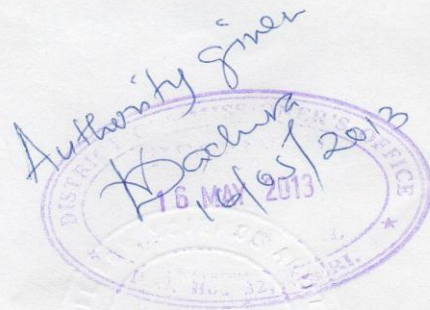
You are advised to report to **the District Commissioner and District Education Officer, Nyeri District** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

  
**SAID HUSSEIN**  
**FOR: SECRETARY/CEO**

Copy to:

The District Commissioner,  
The District Education Officer,  
Nyeri District



*"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development".*



**Research Permit No. NCST/RCD/14/013/639**

**Date of issue 13<sup>th</sup> May, 2013**

**Fee received KSH. 1,000**

**THIS IS TO CERTIFY THAT:**  
**Prof./Dr./Mr./Mrs./Miss/Institution**  
**Jacqueline Ngema Gichuru**  
**of (Address) University of Nairobi**  
**P.O.Box 30197-00100, Nairobi**

**has been permitted to conduct research in**

**Location**  
**Nyeri District**  
**Central Province**

**on the topic: Fire Disaster preparedness strategies in Secondary Schools in Nyeri Central District, Kenya**

**for a period ending: 31<sup>st</sup> May, 2014**



**Applicant's Signature**

**Signature: [Handwritten Signature]**

**Post: Secretary National Council for Science & Technology**

**Signature: [Handwritten Signature]**