# FACTORS INFLUENCING IMPLEMENTATION OF FIRE DISASTER RISK REDUCTION IN PUBLIC SECONDARY SCHOOLS IN NYANDARUA SOUTH DISTRICT, KENYA

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## DECLARATION

This research project is my original work and has not been presented for a 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

I dedicate this research project to my wife Elizabeth Wambui and my children Millicent Nyambura, Faith Wangari and Joseph Mwangi.

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Finally but most important I am grateful to the Almighty God for His love, provision, protection and mercy.

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| | |
|---|---|
| **CEB** | County Education Board |
| **DEB** | District Education Board |
| **DEO** | District Education Officer |
| **DRR** | Disaster Risk Reduction |
| **GOK** | Government of Kenya |
| **HSAC** | Health Safety Advisory Committee |
| **INEE** | Inter-Agency Network for Education in Emergencies |
| **KNAP** | Kenya National Association of Parents |
| **MHEST** | Ministry of Higher Education Science and Technology |
| **MOE** | Ministry of Education |
| **NCST** | National Council of Science and Technology |
| **SPSS** | Statistical package of Social Science Software |
| **UN** | United Nations |

## ABSTRACT

Fire in schools are a public concern because of the increased incidences, injuries and deaths of innocent students not to mention the destruction caused by the fire to the school buildings such as the dormitories and classrooms. Preparedness to fire disaster will help to minimize loss of lives, property and learning time. The purpose of this study was to investigate factors influencing implementation of fire disaster risk reduction in the secondary schools in Nyandarua South District. The study was guided by the following objectives; to determine the extent to which school buildings have been built in accordance with policy provisions pertaining fire disaster reduction, to determine the extent to which the training of principals, teachers and students on fire disaster risk reduction has influenced implementation of fire disaster risk reduction measures in public secondary schools, to establish the availability of firefighting facilities for disasters within school premises in Nyandarua South District and to establish ways in which public secondary schools have put in place fire safety plans as a measure of fire disaster risk reduction preparedness in Nyandarua South District.

The research adopted a descriptive survey design. The target population for this study consisted of all public secondary schools in Nyandarua South 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 students of the sampled schools and an observation schedule. Data collected from respondents was analysed through descriptive statistics. The results were presented using frequency tables.

Based on the findings of the study, the firefighting equipments in most schools were not enough and were rarely inspected contributing to fire disaster risk reduction unpreparedness. In relation to school buildings and fire safety, most schools had made some effort to improve fire disaster preparedness but they still need to do better. On safety plans most schools were not prepared in fire disaster risk reduction because emergence plans for fire disaster in schools were at most average. Most schools had only one assembly point while the majority had none. Most schools did not remind the immediate stakeholders of the evacuation plans. On training in fire disaster risk reduction, most school stakeholders were not trained including the principals. Fire drills were not also carried out.

Based on the findings of the study, the study recommended that school management should consider adding the fire fighting equipments to make them adequate and they should always be inspected to make sure they are functional. It was also recommended that fire extinguishers should be easily accessible, windows should not be grilled, exits should be cleared of obstructions, fire extinguishers should be enough and doors should open outwards. In addition, principles, teachers, non-teaching staff and students should be made aware of evacuation plans, fire assembly points should be identified and stakeholders notified, schools should have fire alert procedures and should have many assembly points in case of fire.

Finally, all principals should be trained on fire disaster risk reduction. There should also be regular fire drills conducted in schools. The study suggested that a similar study be carried out in other areas in Kenya to check on fire disaster risk reduction in school as cases of fire disasters are on the rise in Kenya.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

The threat of fire disaster is always present, and it is important that people are aware of how to properly respond in order to lessen loss of life and injuries and property. 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 disaster in learning institutions in Kenya. Like any other disaster, whenever it happens, it causes a serious disruption of the functioning of the institution 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. The surviving casualties often have mainly serious and extensive burns requiring immediate rescue procedures they cannot always be provided by local resources.

Secondary schools fire disasters are on the increase and have caused death of very many innocent students and destruction of property (KNAP, 2010). This has been as a result of many schools failing to comply with the fire disaster risk reduction measures. For instance in July, 2004 India school fire in which 90 children died was blamed on failure to fully follow safety norms. The school building was overcrowded and had only one exit. There were no emergency doors or the fire fighting equipments (Reuters, 2004). In 1998, a kerosene lantern caused fire and killed 23 girls in a dormitory in Nigeria (Rowan, 2001). In the year 2008, 21 girls in Budo boarding school in Uganda lost their lives through arson (Mzungu, 2008). Due to the loss of

lives, destruction of property and school buildings education has been affected adversely. Quite often schools are forced to close after fire tragedies so that the destroyed properties are replaced as well as rebuilding these schools (KNAP, 2010). Many governments worldwide therefore have come up with rules and regulations governing fire disaster reduction, for example, in April 1996, the Washington Department of Health formed the Washington state school facilities Health and Safety Advisory Committee (HSAC). The HSAC was tasked with developing the guide and related documents with primary focus being to recommend good fire disaster reduction measures to help ensure safety in schools (State Department of Health, USA, 2003). In Fiji the policy on occupational Health and Safety in schools details procedures and guidelines on fire disaster risk reduction as well as safety measures (Government of Fiji, 2006). In Sweden the Work Environment Act of Sweden deals with the general environment of schools with the objective of making it the duty of school managers and surbodinate to use and organize fire disaster risk reduction measures (UNESCO, 1996).

A study that was carried out by KNAP (2010) on fire safety some rules and regulations such as; maintaining proper fire exits and proper exit signage (e.g. exit signs pointing to them that can function in a power failure, compliance with electrical codes to prevent overheating and ignition from electrical faults or problems such as poor wire insulation or overloading wiring, conductors, or other fixtures with more electrical current than they are rated for, placing and maintaining the current types of fire extinguishers' in easily accessible places, prohibiting flammable materials in certain areas of the facility, maintaining fire alarm systems for detection and warning of fire and conduct fire drills at regular intervals throughout the year should be observed by all the secondary schools. This is because according to United Nations to

some extent the degree of exposure to fire disasters in secondary 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 basic training, lack of fire fighting equipments such as the fire extinguishers and lack of exit doors among others (United Nations, 2010). In Kenya many of the factors above have contributed to secondary school fires for instance over the last 10 years, close to 300 schools in Kenya have experienced fire disasters which have resulted to loss of lives and destruction of property. As a result of foregoing Kenya National Association of Parents (KNAP) carried out a study on fire disaster and realized that many schools were not aware of how to respond to fire disasters in their schools (KNAP, 2010). For example in 1998, Bombolulu Girls Secondary School's fire where 27 girls died, overcrowding was one of the factors that contributed to these deaths. At the time of fire, the dormitory had housed 145 students against the optimal capacity of 100 students. The problem was even worse because the front door to dormitory was locked from outside and all the windows were grilled (Gicheru, 1998). This calamity would have been avoided if fire risk reduction measures such as having fire extinguishers, providing emergency exits were in place. In Kyanguli Boarding Secondary School 59 students died in a fire tragedy. The students were in an overcrowded dormitory. One of the doors was locked from outside and all the windows were grilled (David Rowan, 2001).

In Nyandarua County several public secondary schools have experienced fire tragedies, CDE Nyandarua (2013). Njambini High School was closed two times in the year 2012 because of a series of fire in the school which has been burning the school dormitories. The boys had to go home to enable the school to have the dormitories reconstructed (DEO, Kinangop District). In Nyandarua South District many schools

have also experienced fire tragedies. For example in September, 2012 there was fire in Kitogo Secondary School where the boys' dormitory was burnt to ashes destroying all the boys' property (DEO, Nyandarua South). In October, 2012 there was fire in Nandarasi High School where two dormitories and one laboratory were burnt. Property worth thousands of shillings were destroyed which forced the school to close for two weeks to enable the building to be reconstructed using funds from parents and CDF kity and assistance from well wishers.

From the global, regional and national perspective, school safety as well as fire disaster risk reduction is quite important and this is why this study sought to find out factors influencing implementation of fire disaster risk reduction in secondary schools in Nyandarua South District. These factors include the following: fire fighting equipments. In secondary schools there must be enough fire fighting extinguishers located at different buildings. They should be checked regularly to make sure that they are functional. Other fire fighting equipments such as the fire hose reels should also be available and functional. All the secondary schools should also be having fire alarms to alert the students in case of fire. Building rules and regulations should also be followed so as to reduce these deaths caused by fire. The windows of the buildings such as; dormitories, classrooms and libraries should never be grilled. All the doors of the dormitories and classrooms should open outside.

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 because they have invested in education in emergencies. Education in emergencies was

introduced in Kenya a few years and in some universities. It is therefore not fully developed. This means it may take years before it is taught in all the universities. 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 fire disasters in Kenyan schools, schools in Nyandarua South District do not seem to be well prepared in case of fire disasters. It was therefore imperative to carry out a study on the factors influencing implementation of fire disaster risk reduction.

### 1.2 Statement of the problem

School health and safety is quite important and it should be a concern for all the stakeholders to ensure that learners and school property are safe. The school environment should always be safe so as to enable all the learners who enroll in these schools complete their education in the right time without any interference. In public secondary schools, it is important to ensure that students learn in an environment that is free from fire disasters. Fire disasters deprive students' access to the basic fundamental human right to education over an extended period of time. (Government of Kenya, 2009)

In the year 2008, the government of Kenya through the Ministry of Education published the Safety Standards Manual for all schools in the country to serve as a guide towards implementation of safety requirements in schools. In an effort to make sure death of innocent students and destruction of school property are minimized the government made sure that every public school in Kenya got the manual. The government has also made sure that the school buildings are built in accordance to the policy requirements for instance all the school buildings must have exit doors and no windows should have grills, the doors must also open outwards. Through the Ministry

of Education, many seminars on the implementation of the Safety Standard Manual have been held countrywide. Even after the introduction of the Safety Standards Manual the country continue to lose lives of innocent students and property worth millions of shillings through fire tragedies. A study carried out by Gichuru (2013) on fire disaster preparedness strategies in secondary schools shows that there was still a knowledge gap as far as fire disaster preparedness of schools is concerned. Gichuru (2013) observed that in most public secondary schools in Nyeri Central District firefighting equipment were not enough, the principals, teachers and students were not trained in fire disaster risk reduction, most secondary schools did not have fire safety plans and most of the secondary schools did not build the school buildings in accordance to the Safety Standard Manual requirements by the Ministry of Education (2008). This clearly shows that most secondary schools are yet to fully implement fire disaster risk reduction measures. Another study by Makhanu 2009, observes that fire and safety departments in most learning institutions are non-existent or members are not trained or equipped to fight fire in the school. This therefore implied that despite the existence of the Safety Standards Manual secondary schools were faced with challenges of implementing these policies hence the need to establish the reason as to why secondary schools were not able to implement these safety requirements.

### 1.3 Purpose of the study

The purpose of this study was to investigate factors influencing the implementation of fire disaster risk reduction in secondary schools in Nyandarua South District, Nyandarua County, Kenya.

## 1.4 Objectives of the study

This study was guided by the following objectives:

i) to determine the extent to which school buildings have been built in accordance with policy provisions pertaining fire disaster reduction.

ii) to determine the extent to which the training of principals, teachers and students on fire disaster risk disaster has influenced implementation of fire disaster risk reduction measure in secondary schools.

iii) to establish the availability of firefighting facilities for disasters within school premises in Nyandarua South District.

iv) to establish Ways in which secondary schools have put in place fire safety plans as a measure of fire disaster risk reduction preparedness in Nyandarua South District.

## 1.5 Research questions

To help attain the set objectives, the study sought to answer the following questions:-

i) in which ways does the building policy provisions influence implementation of fire disaster risk reduction measures in public secondary schools in Nyandarua South District?

ii) to what extent does the training of principals, teachers and students influence implementation of fire disaster risk reduction measures in public secondary schools in Nyandarua South District?

iii) how does the availability of the firefighting facilities influence implementation of fire disaster risk reduction measures in public secondary schools in Nyandarua South District?

iv) in which ways have safety plans as a measure of fire disaster risk reduction been put in place in public secondary schools in Nyandarua South District?

### 1.6 Significance of the study

Study findings were hoped to create awareness among the schools management, teachers, workers and students on what 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 help principles to implement fire disaster risk reduction measures in public secondary schools in Nyandarua South 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 reduction measures in the schools and as a result they might see the need to improve it so as to save lives of innocent boys and girls in schools.

### 1.7 Limitations of the study

During the study, the researcher encountered several challenges. Among them are; the researcher was not able to control the attitude of the respondents. However, the researcher explained the importance of the study in an effort to have a positive attitude by the respondents. Moreover, the respondents were assured that their identity would not be revealed and this increased the chances of getting accurate information from them.

### 1.8 Delimitation of the study

This study was carried out in Nyandarua South District specifically the 28 public secondary schools in the district. The target population was the principals, teachers

and students in these schools. The study focused on availability of fire fighting equipments, training of principals, teachers and students on fire disaster risk reduction, fire safety plans of the school and whether the school buildings were built in accordance with policy provision pertaining fire disaster preparedness.

### 1.9 Assumption of the study

The study was carried out on the assumption that:

i) all the respondents were ready to co-operate and answer the questions asked honestly.
ii) The implementation of fire disaster risk reduction measures is not affected by lack of funds.
iii) The recommendations of the study would be used by the Nyandarua South D.E.B to mitigate fire disasters in secondary schools in Nyandarua South District.

### 1.10 Definition of operational terms

**Disaster**, refers to a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses that exceed the ability of the affected community or society to cope with using its own resources.

**Emergency**, refers to a disaster which causes a serious disruption of the functioning of the society. It causes widespread human, material and environmental loses which exceed the ability of the affected society to cope with using only its resources.

**Fire Disaster Risk Reduction,** refers to the concept and practice of reducing fire risks through systematic efforts to analyse and manage the causal factors of fire disasters including through reduced exposure to hazards such as exposed electric wires, among others.

**Fire fighting equipments**, refers to the tools for fighting fire like fire extinguishers.

**Risk,** refers to the possibility of something bad happening at some time in future for instance exposed electric wires in schools are risky since they can cause fire.

### 1.11 Organization of the study

The study was organized in five chapters. In chapter one the following were covered; background to the study, objectives of the study, research questions, significance of the study, limitations of the study, delimitations of the study, major assumptions of the study, definition of significant terms and finally the organization of the study. The second chapter focused on review of related literature which included; introduction, the concept of fire disaster risk reduction, adequacy of fire fighting equipments in schools, fire safety plans in schools, training in fire disaster risk reduction, schools buildings and fire safety, summary of literature review, theoretical framework and conceptual framework, chapter three dealt with research methodology, chapter four of this study dealt with data analysis, presentation and interpretation. Chapter five contains the summary of the study, conclusions and recommendations based on the findings of the study.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

## 2.1 Introduction

This chapter focused on important issues that have to be considered in the effective implementation of fire disaster risk reduction. This contained the following sub-topics; introduction, the concept of the fire disaster risk reduction, adequacy of fire fighting equipments, fire safety plans in secondary schools, building requirements and regulations.

## 2.2 The concept of fire disaster risk reduction

According to Makhanu (2009), schools around the country have failed to emphasis on installing fire protection equipments, alarms and first aid kits. Vulnerability of schools to fire disasters is usually attributed to some of the following factors. Foremost, dormitories may not be resistant to fire, i.e. the materials they are build of. They lack fire fighting equipments or the equipments are not operational. Common examples include; installed ventilators that are not operational, exits that are permanently locked or grilled especially windows, no installed alarm system, no fire protection devices such as fire extinguishers, doors that open inwards instead of outwards, such that in events of emergency so many students pursing the door would jam it and eventually caught up by the fire.

Akali, Khabamba and Muyinga (2009), observe that little has been done to prepare schools for fires. Only a few schools have fire extinguishers in offices, dormitories and kitchens and most of them are not regularly serviced. School inspectors (QUASOs) hardly perform safety assessment during routine checks in schools.

Limited supply of water, i.e. many schools experience water shortage more often and lack hydrant points that would be effective in putting out fires. Makhanu (2009), adds that firefighting equipment and other life saving devices should be 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 repair phases. There should be promptness in notifying the fire department for external assistance as employees and students attempt to extinguish the fire themselves hence losing more lives. Construction, installation and maintenance process, including periodic inspection should be done in a manner to ensure safety and ability of firefighting equipment. Fire fighting resource persons could be invited for such exercises as well as giving fire drills. However, most of these activities have not been carried out in the secondary schools in Kenya, thus in case of a fire disaster, schools are still unprepared.

### 2.3 Availability of fire fighting equipments in schools

There are many schools which do not have adequate firefighting equipment (Shaw, 2002). Ians (2010), on a study in India discovered that many schools in the national capital, including private ones did not follow fire safety norms. He noted that most schools were interested in admitting many students without caring about their safety. Mwenga (2008), on a study to establish the safety preparedness of secondary schools in Kyuso District, Kenya established that in that district there are no adequate fire fighting equipments in the schools as majority, 43% had between 1-5 fire extinguishers. In addition, the number of fire fighting equipments, 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. Lucheli and Masese (2009), also noted that the high cost of firefighting equipment has made it impossible for North Rift schools to install the equipments. 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 functional fire extinguishers. Most schools have tried to meet the safety requirement, but fire extinguishers are still a challenge. After the government stopped funding, schools started sourcing, but stringent budgets frustrated their efforts.

According to safety standards manual for schools in Kenya (2008), schools should at all times do the following to prevent fire:- all kinds of trash should be discarded as they tend to quickly catch fire, inflammable substances such as petroleum, paint, chemicals ,etc should be stored in tightly closed cans or containers and away from any source of heat. They should never be stored in classrooms and dormitories, an electrician should regularly check the electrical wiring and replace any that is weak, broken or worn out, learners should not carry or play with matches as they can result in clothing or other items catching fire, the teachers should sensitize learners about the dangers of fire through the related sections in the curriculum, the school should invite the local fire department to give talks and demonstrations to learners about fire prevention in a school context, learners and staff should undertake periodic fire drills at least twice a term and fire extinguishers should be located in strategic places in the schools.

## 2.4 Fire safety plans in secondary 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. Since the safety of the students is of utmost importance, this plan is essential. The document should follow the National Incident Management System (NIMS) and should outline standards 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.

Nakitto & Lett (2012) did a study on the preparedness of Ugandan schools for fires. Fifty schools (day and boarding) were randomly chosen in the fire 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 schools. 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. He concluded that adequate strategies have not been put in place to cope with fire disaster and schools are not prepared at all for disasters. He proposed that to

reduce the adverse effects of disasters through effective precautionary measures like having fire safety plans.

### 2.5 Training in fire disaster risk reduction

Fire disaster risk reduction is the discipline of dealing with and avoiding both natural and man-made fire disasters. It involves preparedness response and recovery in order to lessen the impact of the fire disaster. The principals, teachers, students and all the other stakeholders must be equipped with the right knowledge to handle situations in case of fire tragedy in school (Gozon, 2013). It is therefore imperative for the principal to make sure that fire drills are conducted in the school regularly. Through these fire drills all the students, teachers and all the other stakeholders are informed on what to do in case of fire. They are educated on how to use the firefighting equipment and even how to escape by fire experts from fire department. Lack of this prior knowledge on how to behave in case of fire, has caused death of many students which would have been prevented if proper fire drills were conducted in the schools. The education sector has a key role to prevent and mitigate fire disaster from becoming a major emergency. With the integration of Disaster Risk Reduction in education, children and teachers in school will be equipped with knowledge and skills that would lessen the impact of fire disasters that may strike their schools (Gozon, 2013)

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 a school. This could be as a result of sheer negligence. The safety of students will be enhanced if staff knows what to do before, during and after an outbreak of fire or other emergency. This can be achieved by ensuring that staff and students receives

appropriate training on fire disaster risk reduction. All new entrants to a school should receive instructions on the school fire evacuation routine and receive instruction and training appropriate to their responsibilities in the event of any emergency. Fire drills which may be combined with the instructions should simulate that one escape route is not enough. In school a specific person shall be made responsible for organizing staff training and to co-ordinate the action of the staff in the event of fire.

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 fire very few workers or students may know what to do. 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 firefighting equipment and other life saving skills in event of fire disaster must be regularly done. In most Kenyan schools this kind of training is not given. Teachers and learners may be told what to do generally in case of fire but its practicality is rarely done. This implies that fire disaster risk reduction in secondary schools is still poor.

### 2.6 Implementation of fire safety requirements in secondary school buildings such as dormitories and classrooms

School environment is the entire enclosure designated for use by the school for any of its activities such as learning, playing, games and sports. The school environment must be free from disasters such as fire (GoK, 2009). In the school environment there are several physical infrastructure which need to be constructed according to the set rules and regulations to keep them free from fire tragedies. Such infrastructure include

the dormitories, classrooms, kitchen and libraries among others. These physical facilities should be appropriate and adequate and properly located devoid of any fire disaster risk sign. They should also comply with the Ministry of public Works Building Regulation / Standards. Failure by schools to meet the set standards for infrastructure leads to non-compliance with fire disaster risk reduction preparedness.

### 2.6.1 Laws and policies governing putting up of school buildings

School fire disaster reduction measures are an integral component and legal requirements for all schools to adopt. Failure to adopt these laws has caused the country loss of innocent boys and girls in school fire tragedies, for example all the 59 boys who died in the Kyanguli fire tragedy were in a poorly maintained and overcrowded barracks style dormitory. One of the doors of the dormitory was locked from outside and all of its ten windows were grilled. There were no fire extinguishers. If the dormitory had big doors and windows without grills, many boys would have escaped the fire before the roof fell in (David Rowan, 2001). Due to this and many other fire tragedies experienced in the country the government has come up with laws and regulations governing the putting up of school buildings. For example, the Ministry of Public works building regulations defines the construction requirements and ratio. It defines the whole process of putting up a school building. The children Act 2001 stipulates the rights of a child. It states that all learning institutions shall provide safe and accessible physical environment. If these laws and regulations are adhered to, death and lose of property through fire tragedies would be minimized. It is for this reason that school fire disaster risk reduction preparedness is an integral component of national GoK policies. This makes it compulsory for all schools to implement fire safety requirements. Relevant acts and policy documents should therefore be maintained by all heads of institutions.

## 2.7 Summary of literature review

Although there has been several deaths and loss of property caused by secondary school fire tragedies such as; the 59 students who died in Kyanguli Boarding Secondary School, the 27 girls who died in Bombolulu Girls Secodnary School among others. The area of secondary school fire disaster risk reduction has not been ventured into by many researchers. Mugiti (2012) carried out a study that was on an assessment of fire disaster risk reduction in tertiary colleges in Thika. The study found that, there are disastrous occurrences of fire tragedies. The study also found that most of the institutions had not complied to fire disaster risk reduction measures. Some preparedness measures such as firefighting equipment were not there.

Gichuru (2013) carried out another study on fire disaster preparedness strategies in secondary schools in Githunguri and the study found out that most schools had no capacity to handle emergency like fire and are yet to implement safety standards manual produced in 2008 by the Ministry of Education. The study also revealed that fire fighting equipments in most schools were inadequate and rarely inspected. In relation to building and fire safety most schools had made effort to improve fire disaster preparedness but their preparedness is still poor and needs to be improved.

Considering the studies carried out by Mugiti (2012), Gichuru (2013) and this study, there is a clear indication that secondary schools are not yet prepared for fire disaster risk reduction. The three studies clearly show that firefighting equipment are inadequate, principals, teachers and students are not trained on fire disaster risk reduction, some building policies have not been adhered to since this study revealed that some classrooms doors were still opening inwards. As it was the case with the other studies this study revealed that in most schools there were no evacuation plans and most secondary schools had only one assembly point. This study compare with

the other two in that no public secondary school was found to have had total compliance with fire disaster risk reduction. This study therefore concurs with other studies that were carried out there before.

This shows that despite the government of Kenya putting in place various policies governing compliance with fire disaster risk reduction, total compliance by most secondary school is yet to be realized meaning that there is still a knowledge gap as far as fire disaster risk reduction is concerned. It is therefore imperative that education stakeholders emphasis on the need to ensure and enforce compliance with fire disaster risk reduction measures.

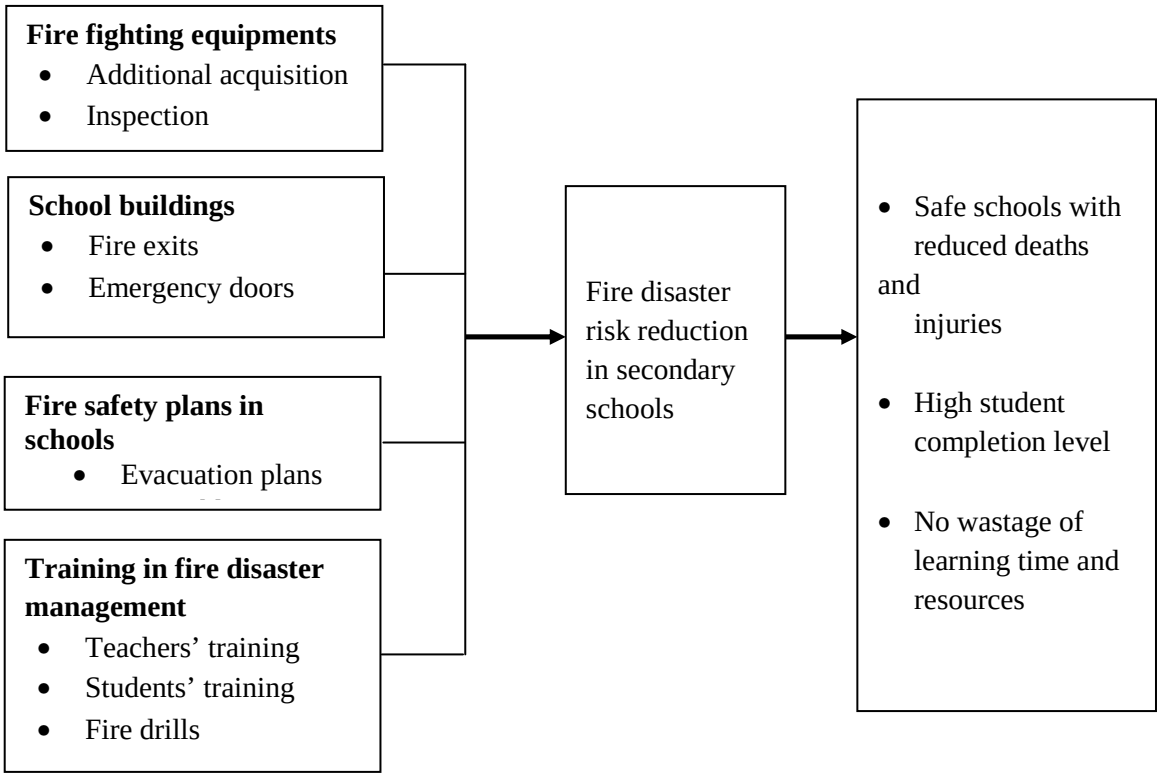
## 2.8 Theoretical framework

The theory that was used as a basis for this study is the basic Needs Theory (Abraham Maslow, 1943). According to this theory, there are certain minimum requirements that are essential to a decent standard of living. These are known as physiological needs. These include; food, shelter, health and clothing. These are primary needs and have to be catered for before other needs. The second level of needs is the security. The next level in the hierarchy consists of sense of belonging and affection, love, esteem and finally self-actualization. On the basis of this theory then, the school safety and security policy underscores the government commitment to the safety and overall welfare of our learners and especially children (MOE, 2008). The security of learners as well as their health is very important. According to Maslow's theory one cannot achieve the next level of needs before satisfying the level below it. This means therefore one can never reach the level of self-actualization before his security is met. No meaningful learning can take place in any learning institution if the security of learners is not met. Fire tragedies deny the learners of this very basic right. This study

therefore attempted to find out to what extent the basic Needs theory was applicable in indicating factors that would contribute to compliance to fire disaster risk reduction.

## 2.9 Conceptual framework

**Figure 2. 1 : Factors influencing implementation of fire disaster reduction**




A concept is an abstract or idea inferred or derived from several specific instances. A concept is a word or phrase that symbolizes several interrelated idea (Smyth, 2004).

This study was based on the premise that satisfactory compliance with implementation of fire disaster risk reduction depends on timely satisfaction of given preconditions like preparedness to involve professionals in putting up school infrastructure, training of principals and other stakeholders on compliance with fire disaster, installation of firefighting equipment in school buildings, and following of the set rules and regulations in putting up of the school buildings. Compliance with

fire disaster risk reduction in secondary schools depends on whether these preconditions are satisfied at the same time.

According to Smyth, (2004), a conceptual framework should assist a researcher to organize his/her thinking and complete an investigation successfully. It explains the possible connection between the variables and answers the why questions. This conceptual framework focused on assessing the outcome on the implementation of fire disaster risk reduction (dependent variable) and factors that influence it (independent variable). The interplay of the factors in the framework may affect implementation differently leading to either more or less compliance. For example, the school needs to be prepared for any fire disaster that might occur. This involves the principal and other stakeholders to be trained in fire disaster reduction, there should also be regular fire drills held in secondary schools. These will help the learners and other stakeholders to know what to do in case of fire tragedy. The principals' attitude towards security and safety of the learners is very important. He should always develop a positive attitude towards fire disaster risk reduction. If all these preparedness measures are taken, they would lead to a high level of compliance to the fire disaster risk reduction which in turn would lead to low death rate in case of fire. The school would also have high enrolment as well as high retention rate.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This dealt with research methodology used in this study. It contained research design, target population, sample size, research instrument, reliability of instruments, data collection procedures and data analysis techniques.

## 3.2 Research design

This study adopted the descriptive survey design to collect data. Descriptive survey is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals (Orodho, 2003). This design can be used when collecting information about people's attitudes, options, habits or any of the variety of education or social issues (Orodho and Kombo, 2002), hence quite appropriate for this study. This study sought for the opinion, habits and attitudes of principals, teachers and students towards secondary school fire disaster reduction.

## 3.3 Target population

Orodho and Kombo (2002) define target population as a group of individuals, objects or items from which samples are taken for measurement, observation and analysis. The target population for this study consisted of all public secondary Nyandarua South District. There were 21 district secondary schools, 6 county secondary schools and 1 national secondary school making a total of 28 schools. There are 11240 students, 281 teachers and 28 principals. (DEO, Nyandarua South, 2013). These made the target population of the study.

### 3.4 Sample size and Sampling procedure

This study employed stratified sampling technique. Stratified sampling technique was used to select the respondents. 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 percent 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 is 32.1 percent of the target schools was selected. Out of 281 teachers, 56 teachers which constitute 10 percent was selected and 1124 students consisting 10perceent was 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. This had 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.

### 3.6 Pilot study

Data collection instrument were pilot-tested to a selected sample which had similar characteristics to the actual sample used in the study. The selected sample did not take part in the actual study. For the case of this study, 2 principals, 5 teachers and 11 students were selected. Pilot testing instruments helped to detect deficiencies such as unclear directions, insufficient space to write the responses and wrong phrasing of questions among others. These were rectified in the process. Vague and ambiguous questions were revealed in the sense that the respondents interpreted them differently. The pilot study was conducted two weeks before the actual study.

### 3.7 Instrument validity

According to Orodho (2008), the validity of a test is a measure of how well a test measures what it is supposed to measure. For the purpose of this study construct validity was used. Construct validity is used to ensure that the measure is actually measuring what it is intended to measure (that is, the construct and not other variables). Construct and content validity of the questionnaire was determined by the help of experts, these are the supervisors. The input and the recommendations by the supervisors were used to improve the instruments. The results got from the pilot study were used to improve the instrument validity.

### 3. 8 Instrument reliability

According to Mugenda and Mugenda (2003), reliability of an instrument is the degree of consistency with which it measures a variable. It is conceived with estimates of the

degree to which a research instrument yield consistent results or data after repeated trials. The reliability of a standardized test is usually expressed as a correlation co-efficient, which measures the strength of association between variables. The researcher employed the test and retest technique in order to improve reliability whereby the questionnaires were administered twice to principals, students and teachers. After the first administration the researcher revisited the schools after two weeks for the second administration. The researcher then used the Pearson's product moment correlation formula below.

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

Where;

r is the degree of reliability

x is the score obtained during the first test

y is the score obtained during the second test

$\sum$ is the summation

N is the number of score within each distribution

### 3. 9 Data collection procedures

The researcher applied for a research permit from the National Commission for Science, Technology and Innovation (NACOSTI). After getting the permit, the researcher proceeded to the study district where he presented the authority letter to the District Commissioner and the District Education Officer. After the relevant officers were contacted for permission the researcher made a pre-visit to the schools. During the visits the researcher requested permission from the principals to be allowed to talk to the other respondents; these are the teachers and students. The researcher informed all the respondents about his mission in school and the actual date when to bring the

questionnaires. During the actual data collection day the researcher administered the questionnaires to all the respondents. As the respondents went on filling in the questionnaires the researcher used the observation schedule to collect the data in the schedule. Afterward the researcher collected the filled in data for analysis.

### 3. 10 Data analysis techniques

According to Mugenda and Mugenda (2003), data analysis refers to examining what has been collected in a survey or experiments and making deductions and inferences. It involves uncovering underlying structures, extracting important variables, detecting any anomalies and testing any underlying assumptions. For the case of this study the researcher edited the filled questionnaire. After correcting any errors that would have influenced data analysis the researcher formulated a coding scheme. For example, the researcher allocated 1 to yes, 2 to no and 0 to do not know. After coding, the data was entered into the computer by a programmer using the Statistical Package for Social Science (SPSS) for analysis. The data was analysed both qualitatively and quantitatively. Qualitative data was analysed thematically as per study objectives that is, putting it into major topics or subjects. Quantitative data was analysed using descriptive statistics which entailed use of mean, mode, percentage and standard deviation which helped to determine the proportions, averages scores and variance for each set of scores in the sample.

### 3. 11 Ethical consideration

Researchers whose subjects are people or animals must consider the conduct of their research, and give attention to the ethical issues associated with carrying out their research. In the course of carrying out this study the researcher did consider some ethical issues. For instance, the researcher assured all the respondents about their confidentiality at all times. This he did through assuring the respondents that their names were not going to be disclosed. The researcher also did obtain an informed consent from the subjects used in the study and also requested the respondents to participate voluntarily. This was done during a pre-visit day.

# CHAPTER FOUR

# DATA ANALYSIS, INTERPRETATION AND DISCUSSION

## 4.1 Introduction

This chapter deals with data analysis, interpretation and presentation. The results presented are 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 was presented using frequency tables, interpretation of the findings was also given.

## 4.2 Questionnaire return rate

The sample population had 9 principals, 56 teachers and 1124 students. All of them returned filled questionnaires. The response was therefore 100 percent.

**Table 4. 3 : Respondents questionnaire return rate**

| | Principals | Teachers | Students |
|---|---|---|---|
| Number | 9 | 56 | 1124 |
| Return rate | 9 | 56 | 1124 |
| Total | 9 | 56 | 1124 |
| Percentage | 100 | 100 | 100 |

## 4.3 Demographic data of respondents

The principals, teachers and students were required to give some demographic information which they gave as follows. The principals were required to say for how long they had been principals and for how long they had served in their current stations as well as the type of their schools. The teachers were required to state for how long they had been teachers as well as for how long they had served in their current stations. The students were required to state their gender, in which form they

were in, for how long they had been in that school as well as the type of their school. The respondents gave the information as follows.

### 4.3.1 Demographic information of teachers and principals

The principals and teachers were asked to say for how long they had been teachers. Their responses were as indicated in the table 4.2.

**Table 4. 4: Response on the demographic information on principals and teachers**

| | Principals | | Teachers | |
|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** |
| 0 – 5 | 2 | 22.2 | 6 | 11.2 |
| 6 – 10 | 7 | 77.8 | 44 | 78.6 |
| Above 10 years | 0 | 0 | 6 | 11.2 |
| **Total** | **9** | **100.0** | **56** | **100.0** |

As shown in the table 4.2, majority of principals 77.8 percent indicated that they had been principals for a period of 6 – 10 years. This shows that they had clear information about their school. 22.2 percent of the principals had been principals for a period of 0 – 5 years. This means they might not be having as much experience as the other principals. 78.6 percent of teachers had been teachers for more than six years. 11.2 percent of the teachers who took part in the study indicated that they had been teachers for more than ten years while another 11.2 percent said they had been teachers for a period between 0 – 5 years.

### 4.3.2 Demographic information of teachers and principals on the length of stay in their current stations

The principals and teachers were asked for how long they had been in their current stations. They responded as in the table 4.3.

**Table 4. 5: Principals and teachers length of stay in the current station**

| | Principals | | Teachers | |
|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** |
| 0 – 5 | 2 | 22.2 | 22 | 39.3 |
| 6 – 10 | 6 | 66.7 | 22 | 39.3 |
| Above 10 years | 1 | 11.1 | 12 | 21.4 |
| **Total** | **9** | **100.0** | **56** | **100.0** |

As evidenced by table 4.3, most principals 66.7 percent had been in their current stations for a period of 6 – 10 years. This means they should be aware of the fire disaster risk reduction measures in their current stations. They should also be aware of factors influencing implementation of fire disaster risk reduction. A good number of principals 22.2 percent had been in their current station for a period between 0 – 5 years while 11.1 percent had been in their current stations for a period of 10 years and above. A good number of teachers 39.3 percent had been in their current stations for a period between 0 – 5 years, another 39.3 percent had been in their current stations for a period between 6 – 10 years while 11.1 percent had been in their current stations for a period of 10 years and above.

### 4.3.3 Demographic information of students

The students were asked to say their gender and their responses were as indicated in table 4.4.

**Table 4. 6: Students response on their gender**

| **Response** | **n** | **%** |
|---|---|---|
| Boys | 618 | 50.0 |
| Girls | 506 | 45.0 |
| **Total** | **1124** | **100.0** |

As shown in table 4.4, most of the students who took part in the study 55 percent were boys while 45 percent were girls.

### 4.3.4 Demographic information of students on their classes

The students were asked to say in which classes they were and they responded as in the table 4.5.

**Table 4. 7: Students response on their classes**

| Response | n | % |
|---|---|---|
| Form I | 108 | 19.6 |
| Form II | 225 | 20.0 |
| Form III | 341 | 30.3 |
| Form IV | 450 | 40.1 |
| **Total** | **1124** | **100.0** |

As evidenced in table 4.5, most of the students who took part in the study were from form four 40.1 percent. Form III also contributed a good number of students 30.3 percent. Very few students from form I 19.6 percent took part in the study. This could be attributed to the fact that form fours were thought to be the most knowledgeable and who could give more accurate information. The students were to take part in this study since they were the main stakeholders in the school. They are also the ones that are mostly affected by the fire in case of an outbreak. The students would also give accurate information on firefighting equipment since they know they are the ones to be affected in case of fire. The more they had stayed in the school, the more they knew of the existence of the firefighting equipment in the school and thus why the mostly used students were those from form four.

## 4.4 Adequacy of fire fighting equipments for fire disaster reduction within the school

The first objective of the study was to establish the adequacy of the fire fighting facilities for fire disaster reduction within the secondary schools in Nyandarua South District. In order to fulfil this objective several items were used as discussed in the following paragraphs.

### 4.4.1 Adequacy of firefighting equipment

Fire fighting equipments are of paramount importance. Secondary schools must have enough of these equipments so as to prepare for the disaster risk reduction. The respondents were asked whether the firefighting equipment in their schools were adequate and they responded as shown below.

**Table 4. 8: Principles, teachers and students response on adequacy of fire fighting equipments**

| | Principals | | Teachers | | Students | |
|---|---|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** | **n** | **%** |
| Adequate | 1 | 11.1 | 12 | 21.4 | 227 | 20.2 |
| Inadequate | 8 | 88.9 | 44 | 78.6 | 897 | 79.8 |
| **Total** | **9** | **100.0** | **56** | **100.0** | **1124** | **100.0** |

As shown in table 4.6, most principals 88.9 percent said that fire fighting equipments were not adequate. This implies that most secondary schools did not have enough facilities to fight fire in case of fire disaster. This therefore indicates secondary schools are not well prepared to fight fire. However, 11.1 percent of principals felt that the schools were well prepared in case of fire disaster. They felt the equipment were adequate to fight fire.

Most students 79.8 percent were of the opinion that the fire fighting equipments in their schools were inadequate. This indicates that most schools were not fully equipped to handle fire disaster. This is lack of preparedness in fire disaster risk reduction. Some students 20.2 percent however felt that the fire fighting equipments were adequate. This could be as a result of ignorance or because that thought the few equipment in the school were adequate to fight any fire.

Most teachers 78.6 percent were of the opinion that the firefighting equipment in their schools was not adequate. A good number of teachers 21.4 percent felt that the fire

fighting equipments were adequate. This could have been contributed by the fact that there were some firefighting equipments in the school. This shows that according to this study and others carried out by others like Gichuru (2013) and Muguti (2012), firefighting equipment are not adequate in most public secondary schools. This also implies that most public secondary schools are yet to implement the Safety Standard Manual for schools (2008). It is therefore important for other studies to be carried out to find out why principals are not able to implement the Safety Standard Manual as well as equipping the schools with firefighting facilities.

### 4.4.2 Adequacy of specific firefighting equipment

The principal, teachers and students were asked about the adequacy of specific firefighting equipment and their responses are recorded as in the table 4.7.

**Table 4. 9: Principals responses on adequacy of specific fire fighting equipments**

| Fire fighting equipment | | Very adequate | Adequate | Inadequate | Very inadequate | Total |
|---|---|---|---|---|---|---|
| Fire hydrants | F | 0 | 0 | 6 | 3 | 9 |
| | % | 0 | 0 | 66.7 | 33.8 | 100 |
| Fire extinguishers | F | 0 | 0 | 6 | 3 | 9 |
| | % | 0 | 0 | 66.7 | 33.3 | 100 |
| Fire resistance materials | F | 0 | 0 | 6 | 3 | 9 |
| | % | 0 | 0 | 66.7 | 33.3 | 100 |
| Fire exits | F | 0 | 6 | 2 | 1 | 9 |
| | % | 0 | 66.7 | 22.2 | 11.1 | 100 |
| Fire protection devices | F | 0 | 2 | 5 | 2 | 9 |
| | % | 0 | 22.2 | 56.6 | 22.2 | 100 |
| Fire blankets | F | 0 | 0 | 4 | 5 | 9 |
| | % | 0 | 0 | 44.4 | 56.6 | 100 |
| Heat / smoke detectors | F | 0 | 1 | 2 | 6 | 9 |
| | % | 0 | 11.1 | 22.2 | 66.7 | 100 |
| Fire alarms | F | 0 | 0 | 2 | 7 | 9 |
| | % | 0 | 0 | 22.2 | 77.8 | 100 |
| Fire hose and nozzles | F | 0 | 0 | 2 | 7 | 9 |
| | % | 0 | 0 | 22.2 | 77.8 | 100 |
| Fire fighters outfit | F | 0 | 1 | 2 | 6 | 9 |
| | % | 0 | 11.1 | 22.2 | 66.7 | 100 |
| Self contained breathing apparatus | F | 0 | 2 | 0 | 7 | 9 |
| | % | 0 | 22.2 | 0 | 77.8 | 100 |
| Reliable water supply | F | 2 | 7 | 0 | 0 | 9 |
| | % | 22.2 | 77.8 | 0 | 0 | 100 |

As shown in the above table, most principals indicated that specific fire safety equipment was not enough. The most adequate firefighting equipment was reliable water supply and the exits. This is because Nyandarua South is located in the highlands where there are a lot of rivers which means piped water in schools is not a problem. Fire exits are adequate because most of the schools are built in accordance to the government requirements on school buildings. The others were mainly

inadequate or very inadequate. This was an indication that most schools are unprepared for fire disasters when it comes to adequacy of firefighting equipment.

**Table 4. 10: Teachers response on adequacy of specific firefighting equipment**

| Fire fighting equipment | | Very adequate | Adequate | Inadequate | Very inadequate | Total |
|---|---|---|---|---|---|---|
| Fire hydrants | F | 22 | 10 | 12 | 12 | 56 |
| | % | 39.3 | 17.9 | 21.4 | 21.4 | 100.0 |
| Fire extinguishers | F | 22 | 22 | 12 | 0 | 56 |
| | % | 39.3 | 39.2 | 21.4 | 0 | 100.0 |
| Fire resistance materials | F | 22 | 22 | 12 | 0 | 56 |
| | % | 39.3 | 39.3 | 21.4 | 0 | 100.0 |
| Fire exits | F | 11 | 22 | 11 | 12 | 56 |
| | % | 19.6 | 39.3 | 19.6 | 21.4 | 100.0 |
| Fire protection devices | F | 0 | 21 | 23 | 12 | 56 |
| | % | 0 | 37.5 | 41.1 | 21.4 | 100.0 |
| Fire blankets | F | 0 | 22 | 22 | 12 | 56 |
| | % | 0 | 39.3 | 39.3 | 21.4 | 100.0 |
| Fire escape ladder | F | 0 | 22 | 22 | 12 | 56 |
| | % | 0 | 39.3 | 39.3 | 21.4 | 100.0 |
| Heat / smoke detectors | F | 10 | 0 | 34 | 12 | 56 |
| | % | 17.9 | 0 | 60.7 | 21.4 | 100.0 |
| Fire alarms | F | 0 | 21 | 23 | 12 | 56 |
| | % | 0 | 37.5 | 41.1 | 21.4 | 100.0 |
| Fire hose and nozzles | F | 0 | 0 | 44 | 12 | 56 |
| | % | 0 | 0 | 78.6 | 21.4 | 100.0 |
| Fire fighters outfit | F | 11 | 10 | 23 | 12 | 56 |
| | % | 19.6 | 17.9 | 41.1 | 21.4 | 100.0 |
| Fire sand buckets | F | 0 | 22 | 22 | 12 | 56 |
| | % | 0 | 39.3 | 39.3 | 21.4 | 100.0 |
| Self contained breathing apparatus | F | 0 | 0 | 44 | 12 | 56 |
| | % | 0 | 0 | 78.6 | 21.4 | 100.0 |
| Reliable water supply | F | 44 | 12 | 0 | 0 | 56 |
| | % | 78.6 | 21.4 | 0 | 0 | 100.0 |

As shown in the table above, majority of the teachers rated the specific firefighting equipment as either inadequate or very inadequate. The firefighting equipment which

was more adequate according to teachers was fire hydrants fire extinguishers, water and fire resistive materials. This implies that incase of fire most of the schools are unprepared. Reliable water was the most adequate because all the schools had piped water. Water is also not expensive. A good number of teachers 39.3 percent also rated fire hydrant, fire extinguishers and fire resistant materials as very adequate. This was so because most of these equipments are not expensive and are thought of as being the most important fire fighting equipments.

**Table 4. 11: Students responses on adequacy of specific fire fighting equipments**

| Fire fighting equipment | | Very adequate | Adequate | Inadequate | Very inadequate | Total |
|---|---|---|---|---|---|---|
| Fire hydrants | F | 0 | 343 | 215 | 566 | 1124 |
| | % | 0 | 30.5 | 19.1 | 50.4 | 100.0 |
| | F | 0 | 458 | 451 | 215 | 1124 |
| Fire extinguishers | % | 0 | 40.7 | 40.1 | 19.1 | 100.0 |
| Fire resistance | F | 0 | 112 | 343 | 669 | 1124 |
| materials | % | 0 | 10 | 30.5 | 59.5 | 100.0 |
| Fire exits | F | 564 | 225 | 335 | 0 | 1124 |
| | % | 50.2 | 20 | 29.8 | 0 | 100.0 |
| Fire blankets | F | 0 | 224 | 340 | 560 | 1124 |
| | % | 0 | 19.9 | 30.2 | 49.8 | 100.0 |
| Fire escape ladder | F | 0 | 0 | 564 | 560 | 1124 |
| | % | 0 | 0 | 50.2 | 49.8 | 100.0 |
| Heat / smoke | F | 0 | 0 | 452 | 672 | 1124 |
| detectors | % | 0 | 0 | 40.2 | 59.8 | 100.0 |
| Fire alarms | F | 115 | 0 | 336 | 673 | 1124 |
| | % | 10.2 | 0 | 29.9 | 59.9 | 100.0 |
| Fire hose and | F | 0 | 115 | 336 | 673 | 1124 |
| nozzles | % | 0 | 10.2 | 29.9 | 59.9 | 100.0 |
| Fire fighters outfit | F | 0 | 0 | 234 | 890 | 1124 |
| | % | 0 | 0 | 20.8 | 79.2 | 100.0 |
| Fire sand buckets | F | 0 | 0 | 115 | 1009 | 1124 |
| | % | 0 | 0 | 10.2 | 89.8 | 100.0 |
| Fire protection | F | 0 | 339 | 559 | 226 | 1124 |
| devices | % | 0 | 30.2 | 49.7 | 20.1 | 100.0 |
| Self contained | F | 0 | 0 | 115 | 1009 | 1124 |
| breathing apparatus | % | 0 | 0 | 10.2 | 87.8 | 100.0 |
| Reliable water | F | 786 | 338 | 0 | 0 | 1124 |
| supply | % | 69.9 | 30.1 | 0 | 0 | 100.0 |

According to table 4.9, most schools had inadequate equipment. The equipments which were more adequate were water supply, fire alarms, fire extinguishers and fire exits. Most students 69.9 percent agreed that reliable water was there. This is so because Nyandarua South District has enough rainfall. Almost all schools through the observation were found to have piped water. A good number of students 89.8 percent felt fire sand buckets and self contained breathing apparatus were very inadequate. This could be attributed to lack of knowledge about their existence. More than half the population of the students 50.2 percent felt that escape ladders were inadequate.

### 4.4.3 Inspection of fire fighting equipments

When asked how regularly fire fighting equipments are inspected, the principals, teachers and students responded as shown in table 4.10.

**Table 4. 12: Principals' responses on inspection of firefighting equipment**

| Response | n | % |
|---|---|---|
| Once per term | 2 | 22.2 |
| Once per years | 2 | 22.2 |
| Once per every two years | 2 | 22.2 |
| Never | 3 | 33.4 |
| **Total** | **9** | **100.0** |

As shown in table 4.10, 33.4 percent of the principals reported that the firefighting equipment were inspected at most once per year. There were also a significant number of principles who indicated that the fire fighting equipments were never inspected. This shows that in case of a fire disaster, even the principals might not know whether the fire fighting equipments were functional or not. This showed lack of preparedness in case of fire disaster.

**Table 4. 13: Teachers' responses on inspection of firefighting equipment**

| Response | n | % |
|---|---|---|
| Once per term | 34 | 60.7 |
| Once per years | 22 | 39.3 |
| **Total** | **56** | **100.0** |

Most of the teachers indicated that fire fighting equipments are inspected once per term 60.7 percent while the other teachers 39.3 percent said that they are inspected once per year. This implies that the teachers responses were contrary to the principals as teachers indicated that the firefighting equipment were inspected more often.

### 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 risk reduction in Nyandarua South District. In an attempt to fulfil this objective, several items were used as discussed below.

#### 4.5.1 Fire exits in the school buildings

The respondents were asked whether there were exits in the school and they responded as shown in the following table.

**Table 4. 14: Principals, teachers and students response on fire exits in the school buildings**

| | Principals | | Teachers | | Students | |
|---|---|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** | **n** | **%** |
| Yes and they are accessible to all | 5 | 56.6 | 45 | 80.4 | 668 | 59.4 |
| Yes but they are not accessible | 4 | 44.4 | 11 | 10.6 | 566 | 40.6 |
| **Total** | **9** | **100.0** | **56** | **100.0** | **1124** | **100.0** |

From the table it is evidenced that all the principals accorded that the schools had fire exits. However, most principals 55.6 percent were of the opinion that the fire exits were accessible to all but there was a significant number of principals 44.4 percent who reported that the fire exits were not accessible to all. This implies that some schools were well prepared for fire disaster as far as accessibility to fire exits was concerned but others were not.

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 were fire exits but they were 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.

When asked whether there are fire exits in the schools, most students 59.4 percent said yes but they are not easily accessible while a significant number 40.6 percent said no and there is no plan in the near future. The implication is that even though there are fire exits in the buildings, in case of fire disaster people in school may still suffer because they cannot access them. This shows lack of preparedness. The findings also show that there are many schools which have no plan of fire exits in the near future. The findings of this study therefore are comparing and agreeing with the studies that were carried out by other scholars for instance Nakitto & Lett (2012) who did a study on the preparedness of Ugandan schools on fire and found that 84 percent of the schools had no safety plans in place. This means that most schools would not be able to cope with fire in case of a disaster. This may therefore imply that some school management are still not very serious in considering fire disaster risk reduction.

### 4.5.2 Aspect of school buildings on 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 summarized below in table 4.13, 4.14 and 4.15.

**Table 4. 15: Principles responses on area of school buildings and fire safety**

| Areas of school buildings | | Strongly agree | Agree | Disagree | Strongly disagree | Total |
|---|---|---|---|---|---|---|
| Exit are clear of obstruction | F | 1 | 5 | 3 | 0 | 9 |
| | % | 11.1 | 55.6 | 33.3 | 0 | 100.0 |
| Fire extinguishers accessible | F | 2 | 2 | 2 | 3 | 9 |
| | % | 22.2 | 22.2 | 22.2 | 33.3 | 100.0 |
| Combustible materials are not used for decorations | F | 3 | 3 | 3 | 0 | 9 |
| | % | 33.3 | 33.3 | 33.3 | 0 | 100.0 |
| Windows in the schools not grilled | F | 2 | 3 | 2 | 2 | 9 |
| | % | 22.2 | 33.3 | 32.2 | 22.2 | 100.0 |
| Doors in school open outwards | F | 4 | 1 | 2 | 2 | 9 |
| | % | 44.4 | 11.1 | 22.2 | 22.2 | 100.0 |
| Boarding facilities have not been designed to lock-in students | F | 2 | 4 | 2 | 1 | 9 |
| | % | 22.2 | 44.4 | 22.2 | 11.1 | 100.0 |
| Halls have emergency doors and fire extinguishers | F | 2 | 2 | 3 | 2 | 9 |
| | % | 22.2 | 22.2 | 33.3 | 22.2 | 100.0 |
| Laboratories have fire fighting equipments | F | 0 | 4 | 2 | 3 | 9 |
| | % | 0 | 44.4 | 22.2 | 33.3 | 100.0 |
| Offices have fire fighting equipments | F | 0 | 1 | 5 | 3 | 9 |
| | % | 0 | 11.1 | 55.6 | 33.3 | 100.0 |
| Kitchen has fire fighting equipment | F | 0 | 2 | 4 | 3 | 9 |
| | % | 0 | 22.2 | 44.4 | 33.6 | 100.0 |

According to table 4.13, most principals indicated that windows in the school have not been grilled, exit doors in buildings in the school open outwards, halls have emergency doors and fire extinguishers but are not very accessible. The laboratory, kitchen and offices do not have firefighting equipment according to majority of

principles. This shows that schools' level of fire disaster preparedness were on the lower side. This could probably be because of the implementation by the principals of the schools safety standards manual that was produced by the Ministry of Education in the year 2008. It could also be so because most of the principals were aware of those schools that had fire disaster in the past.

**Table 4. 16: Teachers responses on area of school buildings and fire safety**

| Areas of school buildings | | Strongly agree | Agree | Disagree | Strongly disagree | Total |
|---|---|---|---|---|---|---|
| Exit are clear of obstruction | F | 33 | 23 | 0 | 0 | 56 |
| | % | 58.5 | 41.1 | 0 | 0 | 100.0 |
| Fire extinguishers accessible | F | 22 | 34 | 0 | 0 | 56 |
| | % | 39.3 | 60.7 | 0 | 0 | 100.0 |
| Combustible materials are not used for decorations | F | 35 | 21 | 0 | 0 | 56 |
| | % | 62.5 | 37.5 | 0 | 0 | 100.0 |
| Windows in the schools not grilled | F | 34 | 12 | 10 | 0 | 56 |
| | % | 60.7 | 21.4 | 17.9 | 0 | 100.0 |
| Doors in school open outwards | F | 44 | 12 | 0 | 0 | 56 |
| | % | 78.6 | 21.4 | 0 | 0 | 100.0 |
| Boarding facilities have not been designed to lock-in students | F | 44 | 12 | 0 | 0 | 56 |
| | % | 78.6 | 21.4 | 0 | 0 | 100.0 |
| Classes built in a way that one can easily escape | F | 32 | 12 | 12 | 0 | 56 |
| | % | 51.1 | 21.4 | 21.4 | 0 | 100.0 |
| Halls have emergency doors and fire extinguishers | F | 32 | 24 | 0 | 0 | 56 |
| | % | 57.1 | 42.9 | 0 | 0 | 100.0 |
| Laboratories have fire fighting equipments | F | 32 | 24 | 0 | 0 | 56 |
| | % | 57.1 | 42.9 | 0 | 0 | 100.0 |
| Offices have fire fighting equipments | F | 32 | 24 | 0 | 0 | 56 |
| | % | 51.1 | 42.9 | 0 | 0 | 100.0 |
| Kitchen has fire fighting equipment | F | 44 | 12 | 0 | 0 | 56 |
| | % | 78.6 | 21.4 | 0 | 0 | 100.0 |

As reflected in the table 4.14, 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, exit 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 contradicted the principals' findings which have shown a low level of fire disaster risk reduction preparedness. This could be attributed to the fact that most principals have complied with the school safety standard manual of 2008 by the Ministry of Education.

**Table 4. 17: Students responses on area of school buildings and fire safety**

The students were asked to indicate their level of agreement in relation to different areas of school building and their fire safety and they responded as follows.

| **Areas of school buildings** | | **Strongly agree** | **Agree** | **Disagree** | **Strongly disagree** | **Total** |
|---|---|---|---|---|---|---|
| Exit are clear of obstruction | F | 115 | 225 | 672 | 112 | 1124 |
| | % | 10.5 | 20 | 59.8 | 10 | 100.0 |
| Fire extinguishers accessible | F | 115 | 113 | 672 | 224 | 1124 |
| | % | 10.5 | 10.1 | 59.8 | 19.9 | 100.0 |
| Combustible materials are not used for decorations | F | 684 | 225 | 103 | 112 | 1124 |
| | % | 60.9 | 20 | 9.2 | 10 | 100.0 |
| Windows in the schools not grilled | F | 330 | 119 | 112 | 563 | 1124 |
| | % | 29.4 | 10.6 | 10 | 50.1 | 100.0 |
| Doors in school open outwards | F | 0 | 226 | 343 | 555 | 1124 |
| | % | 0 | 20.1 | 30.5 | 49.4 | 100.0 |
| Boarding facilities have not been designed to lock-in students | F | 345 | 340 | 336 | 103 | 1124 |
| | % | 30.7 | 30.2 | 29.3 | 9.2 | 100.0 |
| Classes built in a way that one can easily escape | F | 0 | 228 | 457 | 439 | 1124 |
| | % | 0 | 20.3 | 40.7 | 39.1 | 100.0 |
| Halls have emergency doors and fire extinguishers | F | 0 | 231 | 451 | 442 | 1124 |
| | % | 0 | 20.6 | 40.1 | 39.3 | 100.0 |
| Laboratories have fire fighting equipments | F | 234 | 451 | 327 | 112 | 1124 |
| | % | 20.8 | 40.1 | 29.1 | 10 | 100.0 |
| Offices have fire fighting equipments | F | 345 | 449 | 330 | 0 | 1124 |
| | % | 30.7 | 39.9 | 29.4 | 0 | 100.0 |
| Kitchen has fire fighting equipment | F | 345 | 451 | 328 | 0 | 1124 |
| | % | 30.7 | 40.1 | 29.2 | 0 | 100.0 |

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 accessible. These findings concur 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. 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 the damage would be very detrimental.

### 4.5.3 Ways of improving school buildings to enhance fire disaster risk reduction

The principals, teachers and students suggested the following ways to improve fire disaster risk reduction 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. The suggestions by the respondents were agreeing with the study objectives as well as the literature review. This is so because the study sought to investigate the availability of the firefighting equipment training of the principals, teachers and students and whether the building regulations were followed. According to the other related studies done by other scholars, the firefighting equipment were found to be inadequate and principals, teachers and students were not trained on fire disaster risk reduction. This study also revealed the same.

### 4.6 Fire safety plans and fire disaster risk reduction preparedness

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

#### 4.6.1 Evacuation plans in the school

The principals, teachers and students were asked whether the school has evacuation plans in the event of fire disaster and they responded as discussed in table 4.16.

**Table 4. 18: Principals, teachers and students' response on evacuation plans in the school**

| | Principals | | Teachers | | Students | |
|---|---|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** | **n** | **%** |
| Yes, but has never been used | 1 | 11.2 | 44 | 78.6 | 113 | 10.1 |
| Yes, but it has been used | 4 | 44.4 | 0 | 0 | 673 | 59.8 |
| No, but there is plan that it will be made | 4 | 44.4 | 12 | 21.4 | 338 | 30.1 |
| **Total** | **9** | **100.0** | **56** | **100.0** | **1124** | **100.0** |

According to the principals' responses, majority of them 44.4 percent indicated that the school had an evacuation plan in case of a fire disaster. The ones that did not have evacuation plans reported that they were in line to have such plans. This shows that principals are making efforts to improve fire disaster risk reduction.

Majority of teachers 78.6 percent said there are evacuation plans though they have never been used while 21.4 percent said no and there were plans to have it. This means that most schools with evacuation plans have never used them. This is probably because most of the schools have never had fire disasters in the past. Evacuation plans come in when there is a fire disaster because the school

administration can realize its need then. However, without a fire disaster in the past, most schools may not realize the importance of an emergency plan.

From the students who responded, majority 59.8 percent said they do not know whether there is an evacuation plan and 30.1 percent said no and there is no plan to have it in future. The fact that most students were not aware of evacuation plans in the schools shows that in case of the fire disaster, they may not benefit from the same. This is a sign of fire disaster risk reduction unpreparedness.

### 4.6.2 Effectiveness of emergency plans for fire disaster

When asked on the effectiveness of the emergency plans for the disaster, the respondents responded as shown in table 4.17.

**Table 4. 19: Principals, teachers and students' responses on effectiveness of emergency plans for fire disaster**

| | Principals | | Teachers | | Students | |
|---|---|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** | **n** | **%** |
| Effective | 2 | 22.2 | 22 | 39.3 | 0 | 0 |
| Moderately effective | 4 | 44.4 | 34 | 60.7 | 678 | 60.3 |
| Ineffective | 2 | 22.2 | 0 | 0 | 446 | 39.7 |
| Very ineffective | 1 | 11.2 | 0 | 0 | 0 | 0 |
| **Total** | **9** | **100.0** | **56** | **100.0** | **1124** | **100.0** |

As shown in table 4.17, 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 may not effectively help them. This shows inadequate preparedness in fire disaster management. This could have been as a result of most schools having not had fire tragedies in the past.

Most teachers 60.7 percent rated the emergency plans for fire disaster as moderately effective. This means that the emergency plans for fire disaster in schools are not at most average in effectiveness. This indicates lack of seriousness in fire disaster preparedness in schools which could be attributed to lack of fire disaster risk reduction training by both the teachers and the principals.

Most of the students who took part in the study 60.3 percent reported that the emergency plans for the 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 the disasters, they have to improve on the effectiveness of their emergency plans.

### 4.6.3 Number of assembly points in case of fire disaster

When asked about how many assembly points the schools have in case of fire, the principals responded as shown in the tables below.

**Table 4. 20: Principals' responses on number of assembly points in case of fire disaster**

| Assembly points | Frequency | Percentage |
|---|---|---|
| None | 7 | 77.8 |
| Five | 2 | 22.2 |
| **Total** | **9** | **100.0** |

Of the principals 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 of fire breaking out. This shows lack of preparedness. A study carried out by Gichuru (2013) on fire safety in public secondary schools in Nyeri Central and another one by Makhanu

(2009), indicated that fire and safety departments in most learning institutions are non-existent. All these studies as is the case in this study shows that most public secondary schools have only one assembly point. This means that the students do not know where to go in case of a fire disaster.

### 4.6.4 Improving fire safety plans for better disaster preparedness

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

## 4.7 Training on fire safety

The fourth objective was to determine whether secondary schools train teachers, principals, students and other workers on appropriate responses in case of fire in Nyandarua South District. The results are as in table 4.19.

**Table 4. 21: Response on training of the principals, teachers and students in fire disaster risk reduction**

| | **Principals** | | **Teachers** | | **Students** | |
|---|---|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** | **n** | **%** |
| There has been training | 7 | 77.8 | 34 | 60.7 | 0 | 0 |
| There has never been training | 2 | 22.2 | 22 | 39.3 | 1124 | 100 |
| **Total** | **9** | **100.0** | **56** | **100.0** | **1124** | **100.0** |

On whether the members of the staff have been trained on fire safety, majority of the principals 77.8 percent said no while 22.2 percent of the principals said yes. Of the

teachers who took part in the study, most of them 60.7 percent said no while 39.3 percent reported that the members of staff have been trained or equipped to fight a fire, all students said no. students also indicated that fire drills are never carried out in the schools.

### 4.7.1 Reasons for training on fire safety

On reasons for training on fire safety, the principals, teachers and students responded as in table 4.20.

**Table 4. 22 : Response of principals, teachers and students on reasons for training in fire risk disaster reduction**

| | Principals | | Teachers | | Students | |
|---|---|---|---|---|---|---|
| **Response** | **n** | **%** | **n** | **%** | **n** | **%** |
| Fire can happen any time | 2 | 22.2 | 0 | 0 | 561 | 49.5 |
| There has never been a need to train | 7 | 78.8 | 12 | 21.4 | 563 | 50.5 |
| It is a Ministry of Education requirement | 0 | 0 | 44 | 78.6 | 0 | |
| **Total** | **9** | **100.0** | **56** | **100.0** | **1124** | **100.0** |

Majority of principals 78.8 percent said that teachers and students were not trained on fire safety while 22.2 percent reported that teachers are trained on the fire safety because fire disaster can occur at any time. The principals who said they have not trained their members of staff said that there has never been a need to train them 78.8 percent while 22.2 percent said there are no materials to teach them. 11.1 percent said that there has never been a plan to train them but after the study they will now be training. Majority of teachers 78.6 percent 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, 49.5 percent

said that fire can happen any time. This shows that school managers have not yet taken the issue of fire safety to the teachers and students level. Given that most of fire disasters occur in the dormitories and at night, it would be important to train the students on fire safety. Failure to do this is a sign of negligence and unpreparedness to fire disaster risk reduction. As it was observed by Makhanu (2009), most learning institutions did not have fire and safety departments. This could be attributed to the fact that most public secondary schools had not experienced fire disaster there before. Training of the principals, teachers and students is quite important because in case of fire all of them would be knowing what to do to save a life. Principals should therefore take training on fire disaster risk reduction seriously so as to prevent more deaths and destruction of school property as well as wastage of learning time.

### 4.7.2 Ways of improving training in fire safety in schools

The principals, teachers and students suggested that as a way of improving training in fire safety, all stakeholders should be trained in fire safety, all stakeholders should be trained on how to use fire fighting equipments in schools in case of fire disaster. All stakeholders should also be trained on how to handle fire casualties. Fire fighting experts should also be regularly invited in schools to give fire drills to principals, students, teachers and other workers in the school.

## 4.8 Results of observation schedule

The results of the observation schedule are as summarized in table 4.21.

**Table 4. 23: Results of observation schedule**

| Particulars | Details per school |
|---|---|
| Number of fire fighting equipments | Most schools had less than 13 firefighting equipment |
| Firefighting equipment in working conditions | Most schools had less than 13 fire fighting equipments that were functional |
| Type of firefighting equipment | Most schools had only fire extinguishers, fire alarms and water |
| Number of fire exits | Most schools had only one fire exit and some had none |
| Number of emergency doors | Most schools had only one emergency door per building |
| Number of copies of safety plans | Most schools had only one copy of safety plans |
| Number of trained people on fire safety | Most schools had less than three trained people on fire disaster risk reduction |
| Fire safety procedures | Most schools had one or none fire safety procedures |

As indicated in table 4.21, most schools had inadequate fire fighting equipments. Most schools had 5 while the ones with the most firefighting equipment had 13. This shows that fire fighting equipments were not proportional to the number of students. Out of the fire fighting equipments in a school, 3 on the lower side and 13 on the higher side are in working condition. This implies that there are schools with fire fighting equipments which are not in a working condition and this shows fire disaster unpreparedness. The most mentioned firefighting equipment in schools is fire extinguishers and fire alarms. The number of emergency doors per building was either one or none. 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 shows a high level of fire disaster risk unpreparedness. 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 firefighting equipment, safety plans and skills. This implies that most schools in Nyandarua South 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 suggestion for further study.

## 5.2 Summary of the study

It has been discovered 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 Nyandarua South District, schools fire disasters have been reported in Kitogo Secondary School, Nandarasi Secondary School, Mumui Secondary School and Mwendandu Secondary School among others. Fires in schools are a public concern because of the increased injuries and deaths of innocent students not to mention the destruction of property. From the literature in the background, it is clear that schools seem not well prepared for fire disasters. Without fire disaster preparedness, schools will continue to lose lives, property and learning time. It was therefore important to carry out a study on fire disaster risk reduction in secondary schools in Nyandarua South District.

The study was guided by the following objectives; to determine how school buildings are built in accordance with policy provisions pertaining fire disaster reduction, to investigate the extent to which the training of staff and students has influenced implementation of fire risk reduction measure in secondary schools, to establish the adequacy fire fighting facilities for fire disasters within school premises in Nyandarua South District and to establish how secondary schools have put in place fire safety

plans as a measure of fire disaster risk reduction preparedness in Nyandarua South District.

The research adopted a descriptive survey. The target population for this study consisted of 28 public secondary schools in Nyandarua South District with 28 principals, 281 teachers and 11240 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 students. An observation schedule was also used. Data collected from respondents was analysed through a computer programming 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

This study sought to investigate factors influencing implementation of fire risk reduction. The major findings of the study were based on the four objectives of the study. The findings are as indicated in the following four paragraphs.

#### 5.3.1 Findings based on fire fighting equipments

According to the findings of the first objective which was to establish the adequacy of fire fighting equipments within the school, majority of the principals, teachers and students reported that the equipments are not enough. The equipments mostly found in the schools were water supply, fire alarms, fire extinguishers and fire exits. This is evidenced by the majority of principals 77.8 percent who acknowledged that there was reliable water supply in their schools. 66.7 percent of the principals evidenced that the exits were there. A good number of principals 66.7 percent acknowledged that there were fire extinguishers though they were inadequate.

These are not enough in case of fire disaster. This shows that most schools have inadequate firefighting equipment and the learners, teachers and other stakeholders are likely to lose their lives in case of fire disaster.

In addition, the fire fighting equipments are not proportional to the teachers and students population as supported by Mwenga (2008) and Lucheli & Masese (2009). The findings also showed that fire fighting facilities are rarely inspected. This shows that in case of fire the students and teachers as well as other stakeholders might not know whether the fire fighting facilities are still good or not since they are rarely inspected. This is supported by Akali Khabamba & Muyinga (2009) who found out that fire fighting facilities are rarely inspected or serviced. This shows lack of fire disaster risk reduction.

### 5.3.2 Findings based on school buildings

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 that fire exits are there but some respondents reported that they are not easily accessible which means in case of fire they might not help. This is evidenced by the fact that some principals 22.2 percent acknowledged that fire exits were not adequate, some teachers 21.4 percent also felt that fire exits were very inadequate. Most respondents reported that there are some fire extinguishers but only located near the principal's office or the administration block. Most schools have not used combustible materials for decorations which is good in case of fire disasters. This is evidenced by the fact that 33.3 percent of principals strongly agreed that the materials are not used. Another 33.3 percent agreed that the combustible materials are not used for decorations. Most schools have removed grills from the windows and doors. This

is true because 22.2 percent of principals strongly agreed that windows are not grilled. Another 22.2 percent of principals agreed that windows were not grilled. This shows a sign of fire disaster risk preparedness. Most doors in school buildings were found to open inwards which is very dangerous in case of fire disaster inside the buildings. Most schools halls also lack emergency doors and fire extinguishers.

### 5.3.3 Findings based on fire safety plans in schools

Finding of 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 Nyandarua South District such plans have never been used. This is evidenced by the big number of principals 44.4 percent said there were no such plans though they said there was plan to have them in future. This means that students, teachers and other stakeholders may not benefit from evacuation plans and this is a sign of unpreparedness. Majority of respondents proved that the effectiveness of evacuation plans is on average. Majority of the respondents accorded that they do not have fire alert procedures. 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 alert procedures. The findings also show that most schools have only one assembly point while the majority have none.

### 5.3.4 Findings based on training in fire disaster management

The fourth objective was to determine whether secondary schools train principals, teachers 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 in fire disaster risk reduction. This is in line with Makhanu's (2009) and Kukali's (2009) findings. The reason for training is to equip the stakeholders with the required knowledge so as to enable them to escape fire any time it breaks out. The reason for not training was found to be that there has never been a need to train and materials for training are not there. This would therefore mean the school managements waits until fire breaks out so that they see the need of training as well as fire drills. All these show that school stakeholders lack the necessary skills of fire disaster risk reduction hence in case of fire disaster, most of them may not know what to do. This is lack of fire disaster risk reduction preparedness.

## 5.4 Conclusion of the study

The conclusions of this study were based on the four objectives of the study which guided the researcher to investigate factors influencing implementation of fire disaster risk reduction.

### 5.4.1 Conclusion based on adequacy of fire fighting equipments

Based on the findings of the first objective, the fire fighting facilities in most schools are not enough. The firefighting facilities available in most schools though not enough were extinguishers, fire alarms, fire exits and water supply. This is evidence by the fact that 77.8 percent of the principals agreed that there was reliable water supply in the schools. 66.7 percent of the principals acknowledged that fire exits were adequate. The other fire fighting facilities are not enough and the principals, teachers and

students suggested that they should be added. The fire fighting facilities are rarely inspected meaning that they might be non-functional and in case of fire disaster they might not help. It can therefore be concluded that in most schools fire fighting facilities are inadequate which shows fire disaster risk reduction unpreparedness.

### 5.4.2 Conclusion based on school buildings

Finding on the second objective showed that most fire fighting equipments were not found in some buildings. For instance, 33.2 percent of the principals agreed that there were no fire fighting equipments in laboratories, offices and in kitchen. Most of fire extinguishers were only found in the administration block. Exits are there but have obstructions and classrooms doors mostly open inward as evidenced by 22.2 percent of principals. It can therefore be concluded that schools have made effort to improve fire disaster risk reduction preparedness but this still needs a lot of improvement.

### 5.4.3 Conclusion based on fire disasters risk reduction evacuation plans

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. This is evidenced by the fact that most of the principals 78.6 percent agreed that their schools had evacuated plans that had never been 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. This is evidenced by the fact that majority of principals 77.8 percent said there were no fire assembly points in their schools. Most schools do not remind the immediate stakeholders of the evacuation plans which may mean that the plans may not help them in case of a fire disaster.

### 5.4.4 Conclusion based on training of stakeholders on fire disaster risk reduction

Based on the findings of the fourth objective, school stakeholders are not trained on fire disaster risk reduction preparedness and fire drills are rarely conducted in the schools. Majority of principals 77.8 percent said there were no training for the stakeholders. Most of the teachers who took part in the study also said there were no training for the stakeholders. This was based on the reason that there was no need to train on fire safety and there are no materials to train. It can therefore be concluded that schools are not well prepared in fire disaster management because most school stakeholders are not trained in the same.

## 5.5 Recommendations from the study

The study makes the following recommendations based on the findings and conclusions;

i) Based on the findings from the first objective, the school management should consider adding the firefighting equipment like fire exits, reliable water supply, fire extinguishers, fire blankets, fire fighters outfits, the protective clothing, fire hydrants, fire escape ladder and fire hose 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 facilities in schools should be regularly inspected to ensure that they are always functional.

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 principals, 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 and regular fire drills conducted in the schools. There should be training on how to use fire fighting facilities in case of fire disaster. Fire fighting experts should regularly be invited in schools to talk or rather give fire drills to the school 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 disaster 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 disaster in schools in Kenya should also be carried out.

## REFERENCES


Bell J. (1993). Doing your research project, A Guide for first time Researchers in Education and Social Science, 2nd Ed. Buckingham: Open University Press.

Gichuru J. Ngema (2012). M.ed. Research Project on dine disaster preparedness strategies in secondary schools. URI: http://erepository; Uoubi.ac.ke 8080/xmlvi/handle/123456789/56498, date 9 July 2012.

Government of Fiji, (1996). Policy in Occupational Health and Safety in Schools. MOE, retrieved from Fiji – policy-in OHS-in schools – pdf.

Government of India. National Policy on Safety, Health and Environment of Work Place, Ministry of Labour. Retrieved from http://www.labour.mc.in/policy/OSH.policy pdf.

Kenya National Association of Parents (KNAP). Retrieved from knpta.org/activities/projects.

Kukali, A.N. (2009). An evaluation of the state of fire safety policy implementation in girls boarding secondary schools in Bungoma East District. Unpublished Med thesis, Kenyatta University, Kenya.

Lucheli, I. & Masese W. (2009). School disaster preparedness poor. Nairobi Standard Digital.

Makhanu F.N. (2009). Disaster preparedness as a remedy to fire disaster in learning institutions of Kenya centre for disaster management and humanitarian assistance. Unpublished Thesis, Masinde Muliro university of Science and Technology.

Marion W.M. & Maingi S.G. Disaster in Kenya: A major public health concern. Journal of Public health and Epidemiology. Vol. 3(91)

Miles, M.B., and Huberman, M.A. (1994). Qualitative Data Analysis: An expanded sourcebook (second edition). Beverly Hills: Sage.

Ministry of Education (2008). Safety Standards Manuals for Schools in Kenya. Nairobi: MOE.

Mugenda, O.M. & Mugenda, A.G. (2003). Research Methods, Quantitative and Qualitative Approaches. Nairobi. AORS Press.

Mungeti, C. (2012). M.ed. Research Project on Assessment on Disaster Preparedness in Tertiary Colleges in Thika. Maseno University (Unpublished).

Mzungu M. (2008). School fire, deaths but real culprits still at large. The Sunday Standard, P. 39.

Nakitto, M. & Lett, R. (2012). The Preparedness of Ugandan Schools for Fires. Makerere Medical School.

Ndiang'ui, J. (2006). Vulnerability of Kenyan Schools to Disaster. Unpublished MED Thesis, University of Nairobi.

Orodho, A.J. and Kombo, D.K. (2002). Research Methods. Nairobi : Kenyatta University, Institute of Open Learning.

Orodho (2003). Essentials of Educational and Social Sciences research Method. Nairobi: Masola Publishers.

Orodho, J.A. (2008). Techniques of Writing Research Proposals and Reports in Education and Social Sciences. Maseno : Kanezja HP Enterprises.

Otieno S. (2010, November 8th). Kenya Schools ill equipped in face of disaster. The Standard Newspaper. Nairobi: Kenya.

Reuters (2004). Indian school fire kills 90 children. Retrieved 14/12/2012 from www.reuters.com

Rowan O. ( March 2001). Kenya: school fire kills at least 59 students. Retrieved on 3/12/2012 from https://www.wsws.org/articles/2002/Mar 2 mar 2001/Ken-M 30.shtml

Symth, R. (2004). "Exploring the usefulness of a Conceptual Framework as a Research Tool: A research reflection" Issues in Educational Research.

United Republic of Tanzania, (2010). Proposed Education Development Programme (sedp li). 2010-2014). Dar es Salaam: Government of Tanzania.

White, J. (2011). Fire Safety System. New York: Peter Li Education Group.

# APPENDICES

## APPENDIX I

## INTRODUCTORY LETTER TO RESPONDENTS

Mwangi Paul Kanyi
Department of Educational
Administration and Planning
University of Nairobi
P.O. Box 30197
Nairobi

Dear Sir / Madam,

**Re: Data Collection**

I am a Masters of Education student at the University of Nairobi, Department of Education Administration and Planning. I am carrying out a research on the topic "Factors influencing fire disaster risk reduction in secondary schools in Nyandarua South District, Nyandarua County, Kenya."

I am kindly requesting to be allowed to undertake the study in your school. The information you provide will be used for the purpose of the study. The confidentiality of the respondents will be highly respected.

Thank you.

Yours faithfully,

P.K. Mwangi

## APPENDIX II

## QUESTIONNAIRE FOR THE PRINCIPALS

I am Mwangi Paul Kanyi, a final year student in the University of Nairobi. I am carrying out a study on factors influencing implementation of fire disaster risk reduction in secondary schools in Nyandarua South District. The information collected will help to ascertain the factors affecting implementation of fire disaster risk reduction in secondary schools and will not be used for any other purposes. Kindly respond honestly and accurately to questions list below.

**Section I: Demographic Information**

1) For how long have you been a principal?

a) 0 – 5 years ( ) b) 6 – 10 years ( )

c) Above 10 years ( )

2) For how long have you served in the current station?

a) 0 – 5 years ( ) 6 – 10 years ( )

c) Above 10 years ( )

3) What category is your school?

a) National ( ) b) County ( ) c) District ( )

**Section II: Firefighting Equipment**

4) Are the fire fighting equipments in your school adequate?

a) Yes ( ) b) No ( ) c) I don't know ( )

5) Kindly indicate the level of adequacy of the following firefighting equipment in your school.

| **Firefighting equipment** | **Very adequate** | **Adequate** | **Inadequate** | **Very inadequate** |
|---|---|---|---|---|
| Fire hydrants | | | | |
| Fire extinguishers | | | | |
| Fire resistive materials | | | | |
| Fire exits | | | | |
| Fire blankets | | | | |
| Fire protection devices | | | | |
| 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 | | | | |

6) How periodically is firefighting equipment inspected?

a) Once per term ( ) b) Once per year ( )

c) Once every two years ( ) d) Never ( )

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

_____

_____

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

8) Are there fire exits in your school?

a) Yes and they are accessible to all ( )

b) Yes, but they are not accessible to all ( )

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

d) No and there are no plans to install them ( )

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** |
|---|---|---|---|---|
| Fire exits are clear of obstruction all times | | | | |
| Fire extinguishers are in accessible positions | | | | |
| Combustible materials have not been used for decorations | | | | |
| Windows in the schools have no grills | | | | |
| 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 that students can easily escape in case of fire | | | | |
| Halls have emergency doors and fire extinguishers | | | | |
| Laboratories have fire fighting equipments | | | | |
| Offices have fire fighting equipments | | | | |
| Kitchen has firefighting equipment | | | | |

10) Please suggest three ways in which the school buildings can be improved to enhance fire risk reduction preparedness.

_____

_____

_____

**Section IV: Fire safety plans**

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

a) Yes, but has never been used ( )

b) Yes, and it has ever been used ( )

c) I don't know ( )

d) No, but there is plan to have one ( )

e) No, and there is no plan to have one in future ( )

11) How effective are the emergency plans for fire disaster in your school?

a) Very effective ( ) b) Effective ( )

c) Moderately effective ( ) d) Ineffective ( )

e) Very ineffective ( )

12) Does your school have evacuation plans for vulnerable persons, e.g. physically disabled persons in case of fire?

a) Yes ( ) b) No ( )

13) Does your school have fire alert procedures?

a) Yes ( ) b) No ( )

14) How many assembly points does your school have in case of fire?

a) None ( ) b) 1 ( ) c) 3 ( )

d) 4 ( ) e) 5 ( )

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

a) Yearly ( ) b) Half yearly ( ) c) Per term ( )

d) Monthly ( ) e) Weekly ( ) f) Never ( )

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

_____

_____

_____

**Section V: Training on fire safety**

17) (i) Are members of your staff, that is, teaching and non-teaching staff trained in fire disaster risk reduction.

a) Yes ( ) b) No ( )

(ii) If Yes in (i) above, give main reason

a) Fire disaster can happen any time ( )

b) It's a preventive measure to avoid deaths and loss of property ( )

c) It is a Ministry of Education requirement ( )

d) Educators feel safer when the staffs are trained on fire disaster risk reduction ( )

e) Any other specify_____

(iii) If No in (i) above, tick the most applicable response.

a) There has never been a need to train them ( )

b) Education officer do not check ( )

c) There are no materials to teach them with ( )

d) Any other specify_____

18) Kindly indicate your level of agreement to the following statements in relation to training in fire disaster risk reduction where;

Strongly Agree = SA , Agree = A, Disagree = D and Strongly Disagree = SD

| **Statement** | **SA** | **A** | **D** | **SD** |
|---|---|---|---|---|
| Student have been trained on fire disaster risk reduction | | | | |
| Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire | | | | |
| Principal is well trained in fire disaster management | | | | |
| Teachers are adequately trained in fire disaster management | | | | |
| Kitchen staffs are well trained in fire disaster management | | | | |
| Laboratory 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 | | | | |

19) Propose three ways in which training on fire safety can be improved

_____

_____

_____

**Thank you for your participation in this very important study**

## APPENDIX III

## QUESTIONNAIRE FOR THE TEACHERS

I am Mwangi Paul Kanyi, a final year student in the University of Nairobi. I am carrying out a study on factors influencing implementation of fire disaster risk reduction in secondary schools in Nyandarua South District. The information collected will help to ascertain the level of preparedness in fire disaster reduction in secondary schools and will not be used for any other purposes. Kindly respond honestly and accurately to questions list below.

**Section I: Demographic Information**

1) For how long have you been a teacher?

a) 0 – 5 years ( ) b) 6 – 10 years ( )

c) Above 10 years ( )

2) For how long have you served in the current station?

a) 0 – 5 years ( ) 6 – 10 years ( )

c) Above 10 years ( )

3) What category is your school?

a) National ( ) b) County ( ) c) District ( )

**Section II: Fire Fighting Equipment**

4) Are the fire fighting equipments in your school adequate?

a) Yes ( ) b) No ( ) c) I don't know ( )

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

| **Firefighting equipment** | **Very adequate** | **Adequate** | **Inadequate** | **Very inadequate** |
|---|---|---|---|---|
| Fire hydrants | | | | |
| Fire extinguishers | | | | |
| Fire resistive materials | | | | |
| Fire exits | | | | |
| Fire blankets | | | | |
| Fire protection devices | | | | |
| 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 | | | | |

6) How periodically is firefighting equipment inspected?

a) Once per term ( ) b) Once per year ( )

c) Once every two years ( ) d) Never ( )

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

_____

_____

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

8) Are there fire exits in your school?

a) Yes and they are accessible to all ( )

b) Yes, but they are not accessible to all ( )

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

d) No and there are no plans to install them ( )

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** |
|---|---|---|---|---|
| Fire exits are clear of obstruction all times | | | | |
| Fire extinguishers are in accessible positions | | | | |
| Combustible materials have not been used for decorations | | | | |
| Windows in the schools have no grills | | | | |
| 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 that students can easily escape in case of fire | | | | |
| Halls have emergency doors and fire extinguishers | | | | |
| Laboratories have fire fighting equipments | | | | |
| Offices have fire fighting equipments | | | | |
| Kitchen has firefighting equipment | | | | |

10) Please suggest three ways in which the school buildings can be improved to enhance fire risk reduction preparedness.

_____

_____

_____

**Section IV: Fire safety plans**

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

a) Yes, but has never been used ( )

b) Yes, and it has ever been used ( )

c) I don't know ( )

d) No, but there is plan to have one ( )

e) No, and there is no plan to have one in future ( )

11) How effective are the emergency plans for fire disaster in your school?

a) Very effective ( ) b) Effective ( )

c) Moderately effective ( ) d) Ineffective ( )

e) Very ineffective ( )

12) Does your school have evacuation plans for vulnerable persons, e.g. physically disabled persons in case of fire?

a) Yes ( ) b) No ( )

13) Does your school have fire alert procedures?

a) Yes ( ) b) No ( )

14) How many assembly points does your school have in case of fire?

a) None ( ) b) 1 ( ) c) 3 ( )

d) 4 ( ) e) 5 ( )

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

a) Yearly ( ) b) Half yearly ( ) c) Per term ( )

d) Monthly ( ) e) Weekly ( ) f) Never ( )

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

_____

_____

_____

**Section V: Training on fire safety**

17) (i) Are members of your staff, that is, teaching and non-teaching staff trained in fire disaster risk reduction.

a) Yes ( ) b) No ( )

(ii) If Yes in (i) above, give main reason

f) Fire disaster can happen any time ( )

g) It's a preventive measure to avoid deaths and loss of property ( )

h) It is a Ministry of Education requirement ( )

i) Educators feel safer when the staffs are trained on fire disaster risk reduction ( )

j) Any other specify_____

(iii) If No in (i) above, tick the most applicable response.

e) There has never been a need to train them ( )

f) Education officer do not check ( )

g) There are no materials to teach them with ( )

h) Any other specify_____

18) Kindly indicate your level of agreement to the following statements in relation to training in fire disaster risk reduction where;

Strongly Agree = SA , Agree = A, Disagree = D and Strongly Disagree = SD

| **Statement** | **SA** | **A** | **D** | **SD** |
|---|---|---|---|---|
| Student have been trained on fire disaster risk reduction | | | | |
| Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire | | | | |
| Principal is well trained in fire disaster management | | | | |
| Teachers are adequately trained in fire disaster management | | | | |
| Kitchen staffs are well trained in fire disaster management | | | | |
| Laboratory 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 | | | | |

19) Propose three ways in which training on fire safety can be improved

_____

_____

_____

**Thank you for your participation in this very important study**

## APPENDIX IV

## QUESTIONNAIRE FOR THE STUDENTS

I am Mwangi Paul Kanyi, a final year student in the University of Nairobi. I am carrying out a study on factors influencing implementation of fire disaster risk reduction in secondary schools in Nyandarua South District. The information collected will help to ascertain the level of preparedness in fire disaster reduction in secondary schools and will not be used for any other purposes. Your identify 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. Kindly respond honestly and accurately to questions list below.

**Section I: Demographic Information**

1) Please indicate your gender?

a) Male ( ) b) Female ( )

2) In which form are you?

a) Form I ( ) b) Form II ( )

c) Form III ( ) d) Form IV ( )

3) For how long have you been in this school? _____

4) What category is your school?

a) National ( ) b) County ( ) c) District ( )

**Section II: Fire Fighting Equipment**

5) Are the fire fighting equipments in your school adequate?

a) Yes ( ) b) No ( ) c) I don't know ( )

6) Kindly indicate the level of adequacy of the following firefighting equipment in your school.

| **Firefighting equipment** | **Very adequate** | **Adequate** | **Inadequate** | **Very inadequate** |
|---|---|---|---|---|
| Fire hydrants | | | | |
| Fire extinguishers | | | | |
| Fire resistive materials | | | | |
| Fire exits | | | | |
| Fire blankets | | | | |
| Fire protection devices | | | | |
| 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) How periodically is firefighting equipment inspected?

a) Once per term ( ) b) Once per year ( )

c) Once every two years ( ) d) Never ( )

8) Kindly suggest three firefighting equipment which need to be added in the school to improve fire preparedness in terms of adequacy of firefighting equipment.

_____

_____

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

9) Are there fire exits in your school?

a) Yes and they are accessible to all ( )

b) Yes, but they are not accessible to all ( )

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

d) No and there are no plans to install them ( )

10) 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** |
|---|---|---|---|---|
| Fire exits are clear of obstruction all times | | | | |
| Fire extinguishers are in accessible positions | | | | |
| Combustible materials have not been used for decorations | | | | |
| Windows in the schools have no grills | | | | |
| 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 that students can easily escape in case of fire | | | | |
| Halls have emergency doors and fire extinguishers | | | | |
| Laboratories have fire fighting equipments | | | | |
| Offices have fire fighting equipments | | | | |
| Kitchen has firefighting equipment | | | | |

11) Please suggest three ways in which the school buildings can be improved to enhance fire risk reduction preparedness.

_____

_____

_____

**Section IV: Fire safety plans**

12) Does your school have an evacuation plan in the event of fire?

a) Yes, but has never been used ( )

b) Yes, and it has ever been used ( )

c) I don't know ( )

d) No, but there is plan to have one ( )

e) No, and there is no plan to have one in future ( )

13) How effective are the emergency plans for fire disaster in your school?

a) Very effective ( ) b) Effective ( )

c) Moderately effective ( ) d) Ineffective ( )

e) Very ineffective ( )

14) Does your school have evacuation plans for vulnerable persons, e.g. physically disabled persons in case of fire?

a) Yes ( ) b) No ( )

15) Does your school have fire alert procedures?

a) Yes ( ) b) No ( )

16) How many assembly points does your school have in case of fire?

a) None ( ) b) 1 ( ) c) 3 ( )

d) 4 ( ) e) 5 ( )

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

a) Yearly ( ) b) Half yearly ( ) c) Per term ( )

d) Monthly ( ) e) Weekly ( ) f) Never ( )

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

_____

_____

_____

**Section V: Training on fire safety**

19) (i) Are members of your staff, that is, teaching and non-teaching staff trained in fire disaster risk reduction.

a) Yes ( ) b) No ( )

(ii) If Yes in (i) above, give main reason

k) Fire disaster can happen any time ( )

l) It's a preventive measure to avoid deaths and loss of property ( )

m) It is a Ministry of Education requirement ( )

n) Educators feel safer when the staffs are trained on fire disaster risk reduction ( )

o) Any other specify_____

(iii) If No in (i) above, tick the most applicable response.

i) There has never been a need to train them ( )

j) Education officer do not check ( )

k) There are no materials to teach them with ( )

l) Any other specify_____

20) Kindly indicate your level of agreement to the following statements in relation to training in fire disaster risk reduction where;

Strongly Agree = SA , Agree = A, Disagree = D and Strongly Disagree = SD

| **Statement** | **SA** | **A** | **D** | **SD** |
|---|---|---|---|---|
| Student have been trained on fire disaster risk reduction | | | | |
| Some individuals in the school are provided with a personal copy of prepared written instructions on what to do in case of a fire | | | | |
| Principal is well trained in fire disaster management | | | | |
| Teachers are adequately trained in fire disaster management | | | | |
| Kitchen staffs are well trained in fire disaster management | | | | |
| Laboratory 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 | | | | |

21) Propose three ways in which training on fire safety can be improved

_____

_____

_____

**Thank you for your participation in this very important study**

## APPENDIX V

## OBSERVATION SCHEDULE

| **Particulars** | **Details per school** |
|---|---|
| Number of fire fighting equipments | |
| Firefighting equipment in working conditions | |
| Type of firefighting equipment | |
| Number of fire exits | |
| Number of emergency doors | |
| Number of copies of safety plans | |
| Number of trained people on fire safety | |
| Fire safety procedures | |

## APPENDIX VI

## RESEARCH PERMIT

THIS IS TO CERTIFY THAT:
*MR. PAUL KANYI MWANGI*
of UNIVERSITY OF NAIROBI, 347-0
kinangop,has been permitted to
conduct research in *Nyandarua County*

on the topic: *FACTORS INFLUENCING IMPLEMENTATION OF FIRE DISASTER RISK REDUCTION IN SECONDARY SCHOOLS IN NYANDARUA SOUTH DISTRICT, KENYA*

for the period ending:
*31st August,2014*

.....
*Applicant's Signature*

Permit No : NACOSTI/P/14/2136/2276
Date Of Issue : 2nd July,2014
Fee Recieved :Ksh 1,000

.....
*Secretary*
*National Commission for Science, Technology & Innovation*

**CONDITIONS**

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

**REPUBLIC OF KENYA**

NACOSTI

**National Commission for Science, Technology and Innovation**

**RESEARCH CLEARANCE PERMIT**

**Serial No. A** 2123

**CONDITIONS: see back page**

## APPENDIX VII

## RESEARCH AUTHORIZATION LETTER


**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date:

**2nd July, 2014**

**NACOSTI/P/14/2136/2276**

Paul Kanyi Mwangi
University of Nairobi
P.O.Box 30197-00100
**NAIROBI.**

**RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on ***"Factors influencing implementation of fire disaster risk reduction in secondary schools in Nyandarua South District, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nyandarua County** for a period ending
**31st August, 2014.**

You are advised to report to **the County Commissioner and the County Director of Education, Nyandarua County** 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 County Commissioner
The County Director of Education
Nyandarua County.