

ASSESSING IMPACTS OF FLOODS ON ACCESS TO PRIMARY EDUCATION

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ABSTRACT

Floods are among the most common and destructive hazards. The destruction of schools is one way in which floods can inhibit educational attainment that consequently derails economic development. Education as a human right is universal and inalienable. The purpose of the study was to assess the effects of floods on learners' access to primary education in Livunzu Education zone, T/A Makhwira, Chikhwawa District southern Malawi. The research objectives formulated to guide this study are to: assess impacts of floods on classroom participation, establish effects of floods on school attendance, determine performance of learners when flood strikes and determine effects of floods on students' enrolment in Livunzu educational zone. The study used a research design of 197 learners drawn from the randomly selected 4 schools, 68 school teachers, and 4 Head teachers. Questionnaires and observation checklists were used to collect data. Descriptive statistics and paired student *T* test were used to analyze data. Findings revealed that floods not only make school inaccessible, but they also destroy infrastructure, make roads impassable for students and teachers displace families and destroy farms which contributed grossly to the livelihoods of people in the area. Floods hamper enrolment as parents do not want to endanger the lives of the children so schools prone to floods have a high chance of closing down due to low enrolment. The findings also revealed that floods substantially lower learners' performance in terminal examinations. Annually recurring floods regularly prevent millions of children from attending a full year of school. At times the learning resources and materials are washed away or destroyed or rendered unusable. Schools may be used as shelters for people who have been displaced from their homes due to floods. Every year floods provoke delay to study programs and damages to schools. So there is need for a paradigm shift from reactive to proactive flood management. Therefore, it's recommended that schools should engage qualified professionals to assess school buildings, design, construct and maintain school facilities to be resilient in the face of recurrent floods and other weather-related disasters. Disaster risk reduction should be integrated in the syllabus. Head teachers, teachers and learners should undergo annual training on disaster risk reduction.

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CHAPTER ONE: INTRODUCTION

1.0 Background

In recent years, there has been a growing concern that increasing numbers of the world's population are vulnerable to the adverse impacts of disasters resulting from natural hazards (Conteh, 2015). He further argued that, these concerns are particularly relevant for Sub-Saharan Africa, where a larger proportion of the population is younger than anywhere else, and where the frequency and intensity of natural hazards are expected to increase, among others due to the possible consequences of global climate. One of the most frequent disasters in Sub-Saharan Africa is flooding. Sufficing to flood frequency rise, the CRED data on the frequency of disasters resulting from a natural hazard in 2011 reveals that floods, as a form of hydrological disaster still lead all other disasters in occurrence, in the number of people affected and in resultant economic losses, with these numbers rising, (Guha-Sapir *et al.,* 2012). For instance, "173 of the 332 disasters registered in the year 2011 were flood disasters, representing a share of 52.1 per cent of total disaster occurrence globally. Floods were responsible for 57.1 per cent (139.8 million) of total disaster victims (244.65 million), 20.4 per cent of the total reported number of people killed and 19.3 per cent of total damages. When compared to the previous decade (2001-2010), the number of flood disaster victims in the year 2011 increased by 31 percent" (CRED, 2012)

Flooding occurs when there is an overflow of a large amount of water beyond its normal confines. Large populations live in the coastal areas where they are exposed to flooding (Jongman *et al.*, 2012). Floods are a problem when the magnitude and impacts of their occurrence exceeds the ability of affected communities to cope or they become a disaster when an event leads to a serious disruption of the functioning of a community or society causing widespread human, material, economic and or environmental losses, which exceed the ability of the affected society to cope using their own resources (UNISDR, 2009) Exposure to floods is increasing because human occupation of flood plains and flood prone coastal zones intensifies (Genovese *et al.,* 2007). In the developing world, flood defences are less developed and the exposed populations are more often subject to flooding with consequent disruption, economic loss, and in the worst cases loss of life (UNEP, 2002).

Impacts of floods are felt in different sectors: economy, agriculture, transport and infrastructure, tourism and education. The sectors outlined jointly determine social economic development of a country (Save the children, 2016). In Cambodia the Mekong flood of 2000 gave the worst experience in the last 70 years, causing both socio-economic and physical damages. According to the official report of the National Committee for Disaster Management (NCDM), the floods affected about 3.4 million people with 347 fatalities, 80 percent of which were children of school going age (Cambodia, 2008).

In Africa, between the years 2000 and 2001, about 35 million people which were about 13% of the total population of the continent were affected by the floods. Majority of the affected were school going children whose education system was destroyed (ZVAC, 2007). Concurring to flood impacts on education sector, Conteh, (2012) established that floods being the most common disaster in sub- Saharan Africa has potential impact on children's schooling outcomes owing to larger proportion of the population been younger than anywhere else. Each year flooding has a major impact on children, youth and education systems. Big or small, these result in children missing school days, absenteeism by teachers who themselves may be affected by flood hazard, disruption of education cycles, school closure because of damage and destruction to school infrastructure, or repeated or prolonged use of schools as emergency shelters (Save the children, 2016).

In Malawi disasters are also the growing concern. There are floods or dry spell or both almost yearly. The intensity and frequency of disasters have been increasing, in the face of climate change, population growth, urbanization and environmental degradation. The 2015 floods were the most devastating in terms of geographical coverage, severity of damage and extent of loss (PDNA, 2015). The flood damaged various sectors of development including education where total estimated loss in education sector was US$ 12.4 million where primary education sector constituted majority of losses which was at 96.7% (PDNA, 2015). In 2019, floods resulted also in the partial or total destruction of 154 out of 2,460 public primary schools and of 455 out of 7,318 Early Child Development Centres. District education offices reported cases of school infrastructure including toilets, teachers' houses and classrooms being destroyed by floods. More than 5500 desks and

967 learners' toilets were reported to be destroyed. Almost 67,347 school textbooks were reported to be damaged, to a value of approximately US$ 12.4 million (PDNA, 2019).

Education as a human right is universal and inalienable and is especially important in enabling people to reach their full potential and exercise other rights. This right does not disappear or get suspended because of disasters and emergencies (AKello, 2014). When education is interrupted or limited, students drop out, with negative and permanent economic and social impacts for students, their families, and their communities (Matiki, 2005). Flooding has also a negative impact on school attendance because school children cannot cross flooded rivers. Floods also result in the destruction of water and sanitation infrastructure. This has negative impacts on schools as a result of coming into contact with contaminated water that increases the prevalence of water-related diseases and this leads to chronic absenteeism which hampers learning (Akello, 2014).

1.2 Problem statement

According to Sendai framework for disaster risk reduction (UNISDR, 2015), the third global priority is to investing in disaster risk reduction for resilience. Additionally, the fourth global target is to substantially reduce disaster damages on critical infrastructure and disruption of basic services among them healthy and educational facilities. Guided by the Sendia frame work, Malawi for recent years has significantly engaged Disaster Risk Management (DRM) approaches in an attempt to achieve resilient nation. Among other national strategic documents, Malawi has: National Disaster Risk Management Policy of (2015), Malawi National Resilience Strategy of (2018), Post Disaster Needs Assessment of (2019), National Contingency Plan of (2013) and the current National COVID-19 Preparedness and Response Plan of (2020). The cited documents guide DRM in Malawi by provision of insights about hazard identification, risk assessment, damage and loss assessments, response and recovery strategies among others. However, the National documents addressed much on issues to do with, Agriculture and food security, housing and infrastructures, healthy and economy. The education sector has not been appropriately discussed, worse still, the impacts of floods on education have only been articulated on basis of economic perception and not linking it on education criteria. For instance, The PDNA report of 2019 stated that

"floods resulted in partial or total destruction of 154 out of 2460 public primary schools, the total value of the effects of floods on education sector is estimated at US$21 million of which damage constitutes US$ 21.03 million and loss constitute US$0.75" (PDNA, 2019). There is convincing evidence from literature that impact of floods on education in Malawi is only deemed in terms physical damage of school infrastructure and national economic drawback, considering this gap, this study attempts to assess impacts of floods on access to primary education by evaluating how teaching and learning indicators are affected by floods.

1.3 Main objective

The study aims at evaluating impacts of floods on access to primary education in Livunzu education zone in the district of Chikhwawa.

1.3.1 specific objectives

1. To assess impacts of floods on classroom participation
2. To establish effects of floods on students' school attendance in Livunzu educational zone.
3. To determine impacts of floods on performance of learners in Livunzu education zone.
4. To determine effects of floods on students' enrolment in Livunzu education zone.

1.4 Study hypothesis

- HO: occurrence of floods in Livunzu education zone affects access to primary education
- HO_1: occurrence of floods in Livunzu education zone has no significant effects on access to primary education

1.5 Research questions

The study will answer the following question:

- What are the effects of flood on classroom participation?
- What are the effects of floods on learners' attendance on primary education in Livunzu education zone?
- What is the performance of learners when flood strikes in Livunzu education zone?

- What are the effects of floods on student enrolment on primary education in Livunzu education zone?

1.6 Significant of the study

The fourth goal in the Sustainable Development Goals (UN, 2015), seeks to ensure inclusive and equitable education and promote lifelong learning opportunity for all. It entails that education is one of key priorities in sustainable development agendas thus a need to consider factors affecting it. Concurring to the same, the third priority of Sendai framework for Disaster Risk reduction (DRR) is to investing in disaster risk reduction for resilience (UNISDR, 2015). One way among others of achieving this priority is through coordination of Academia, scientific and research entities and networks to focus on the disaster risk factors and scenarios. This study therefore will complement the role of academia in scientific research for disaster risk reduction, it will provide a scientific basis that will justify needs for mainstreaming DRR in education sector for example, influence curriculum revision and inclusion of disaster information in school syllabus, elicit formulation of education policy for example, education management in emergence, and the study will also provide a Basis for further research studies.

1.7 Limitations of the Study

According to Best & Khan (2009), limitations are conditions beyond the control of a researcher that may place restriction on the conclusions of the study and their application to other situations.

I. The study was conducted during dry season in which floods do not occur, this did not give chance the researcher to observe the extent to which flood affects the area.
II. The study relied on information from, head teachers, teachers and learners and omitted other stake holders like parents, local authorities, local organizations and other opinion leaders.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter reviews the literature related to flood hazard on education. The emphasis is made on the underlying study objectives.

2.1 Floods and learners' participation in education

In all societies, children represent hope for the future. By extension, schools, because of their direct link to youth are universally regarded as institutions of learning both for instilling cultural values and for passing traditional and conventional knowledge to the younger generation (Achoka and Maiyo, 2008). He further argued that protecting the children and schools during natural hazards is paramount in 21st century. This argument reveals the gap in Malawi national education standard of (2015). Which only denotes matters of students' safety and protection with standard measure of the school's effectiveness in keeping its students from abuse and harm of different kinds for example physical, sexual and emotional abuse. Simply put, the cited national education standard, targets social protection leaving hazard threat unaddressed which significantly downplay students' safety and protection resulting to low participation of students in schools.

Of recent years, majority of research on education and climate change has focused on impacts of climate and associated environmental change on schooling (Oundo, 2011). According to recent publications: save the children's (2008) –legacy of disasters and UNICEF UK'S (2008) –our climate and children are our responsibility, it is children who will be hardest hit by the effects of climate change. For instance, the aftermath of cyclone Sidr which struck Bangladesh in November 2007, left 74 government primary schools destroyed and another 8817 damaged. An estimated 103664 pupils were affected as a result. The estimated cost of reconstruction and rehabilitation was more than US$82 million (Das, 2008). Similarly, in Cambodia the 2000 flood destroyed approximately 18% of country's schools, impacting the education of 500,000 children and costing US$1.6 million in rehabilitation costs. Public transport in Cambodia is limited, so students use their

own means to travel to school. Most travel by foot or bicycles so some students suspend their studies for month or two due to road damage caused by floods (lay et.al 2008)

There have been many attempts at explaining education and learning processes both in Australia and overseas in terms of learners missing classes due to floods according to (Molino and Steward, 2007). They noted that 80% of pupils missed classes due to flood.

2.2 Impacts of floods on attendance

In Bangladesh, there was a 20 percent drop in attendance after the 2007 floods. During the floods 1.6 million children were affected as schools were damaged and some used as shelters (IRN, 2013). Similarly, hurricane Sandy in 2012 destroyed hundreds of public buildings and facilities including schools. More than 100 schools were closed due to damage e and over 50 were completely damage (Akello, 2014). Sufficing on the same, in Zambia, the students were unable to cross rivers due to collapsed bridges and culverts. The most affected districts reported 40 to 50 per cent reduction in attendance (ZVAC, 2007). In Kenya a sizeable number of children still find themselves out of school owing to a number of reasons one of them being floods (Julius, 2008). During floods many roads are destroyed or washed away making schools inaccessible therefore the attendance rate becomes low. Usable toilets are limited and health facilities unreachable causing learners to suffer illnesses hence unable to attend school after learning resumed in schools (Okuom et al, 2012). Since some of the flood prone schools are in the rural areas the teachers opt to relocate to urban areas (INEE, 2012). During floods families may not afford the opportunity costs associated with their children attending school rather than earning money by scavenging it (INEE, 2012).

2.3.0 Impacts of floods on learners' performance

Floods have led many schools to be closed and others used for emergency shelters, when floods occur schools are either closed, marooned or partially submerged in flood waters and this makes the roads bridges and footpaths impassable for students and teachers. Accessing the schools become almost impossible as both teachers and learners have challenges wading through the flood waters (Akello, 2014). Research on past school closures indicate that any interruption in schooling, including regularly scheduled breaks,

can result in significant learning loss. Slade et al., (2017) show that in Malawi, transitional breaks from grade 1 to 2 and grade 2 to 3 lead to an average reduction of 0.4 standard deviations on four different measures of reading skills.

Studies measuring the impact of school closures due to extreme weather conditions and natural disasters point to serious consequences for learning. Marcotte and Hemelt (2008) found that in Maryland, United States, for each day schools were closed due to snow, the number of students who performed satisfactorily on state reading and mathematics assessments decreased by 0.5 per cent. Similarly, Andrabi et al., (2020) found that the 3.5-month school closure after the 2005 earthquake in Pakistan resulted in learning loss equivalent to 1.5 school grades. This is supported by the research findings of Okuom *et al.*'s (2012) that fear, insecurity and general high alert during floods reduced student's attention to learning, resulting to poor performance. Mudavanhu (2014) concurred that, floods cause loss of learning hours, loss of qualified personnel, outbreak of waterborne diseases, high absenteeism and low syllabus coverage leading to children's poor academic performance.

2.3.1 Impacts of floods on human capital and educational attainment

Education has been described as a major contributor to growth. Human capital accumulation which is explained with investments in education is a strong determinant of economic progress as seen in labour productivity and social outcomes (Barro and Lee, 2013). An abundance of well-educated human resources can be hampered by various natural disaster shocks. One of important factors in education attainment is human capital. Julius, (2008) argued that, qualified teachers may find it difficult to take up teaching jobs in the flood plain regions thus causing perennial shortage of qualified staff. Ultimately, this will affect enrolment, quality of education, overall performance of the students and the school. He further suggested that gains that have so far been registered following the introduction of free primary education in 2003 could be eroded. This situation will result in an increase in wastage as a result of students' dropout and repetition. This could render the country unable to attain the Millennium Development Goals and Education (Onigbinde, 2018). Again he discussed that, long-term impacts of rainfall shocks in India

show that more rainfall during school years (particularly ages 11– 13) lowers total years of schooling. For this age group, the likelihood to drop out significantly increases with positive rainfall shocks. Thus, positive employment shocks are particularly detrimental to human capital investment during this period. Schools represent repositories for the formation of educational human capital by building positive externalities for society and instilling skills, attitudes, and values (Baez et al, 2010). Therefore, the role of schools, in addition to other tremendously crucial factors, are all equally important in the formation of human capital. But the role of schools surpasses not only the formation of human capital and goes further to ensure the reconstruction and returns on children to help the government rebuild the social contract (UNDP report, 2005).

It is therefore evident that flood delays human capital development by prolonging school years due to high repetition rates, poor performances resulting from inconsistent attendance and lowered classroom participation. Additionally, insufficient teaching staff in flood prone areas has facilitated low quality of education attainment.

2.4 Impacts of floods on school enrolment

Floods hamper enrolment as parents do not want to endanger the livelihoods of the children. So schools prone to floods have a higher chance of closing down due to low enrolment. The impact of loss of livelihood as a result of the floods can hamper enrolment so they fail to register their children for lack of funds (INEE, 2012). During floods schools become inhabitable and roads impassable, these discourage parents as well as the learners from registering in such schools. In Ethiopia, 385,000 children need emergency education (IRIN, 2012), between June and July 2012, the dropout rate had reached 50 percent (UNICEF, 2012) because of floods. In Cambodia during floods students encounter a lot of difficulties to reach school. The average dropout rate in 3 flood prone provinces is 7 per cent per annum that is 1700 students per year in 2007 (Lay et.al, 2008). Similarly, in Kenya, the situation is not different as the dropout rate increases during floods Nyakundi et al, (2010)

CHAPTER THREE: METHODOLOGY

3.0 Study area

The study was conducted in Livunzu educational zone in Tradition Authority Makhwira, the East bank of Chikhwawa district, southern Malawi. The area has 13 public primary schools. It is substantially affected by floods almost yearly due to its terrain characteristics as it is part of shire valley basin, proximity to shire river, availability of dense stream networks and it also lies on distal margin of Thyolo escapements a factor that exposes the area to runoff impacts from uplands. The map below depicts those features that expose the area to floods. The researcher also observed that rivers in the area are highly silted leading to shallow river channels which may reduce capacity of rivers to hold sufficient rain water. The area is not much proximal to shire river however; the rivers are tributaries of shire river. In the rain season the rivers are blocked to discharge water into shire river due to current differentials as the result, the water level starts to rise from confluences backwards. This becomes flooding logic of the study area. Additionally, due to generally flat terrain and shallowness of liver channels, the rivers overflow causing floods in the area.

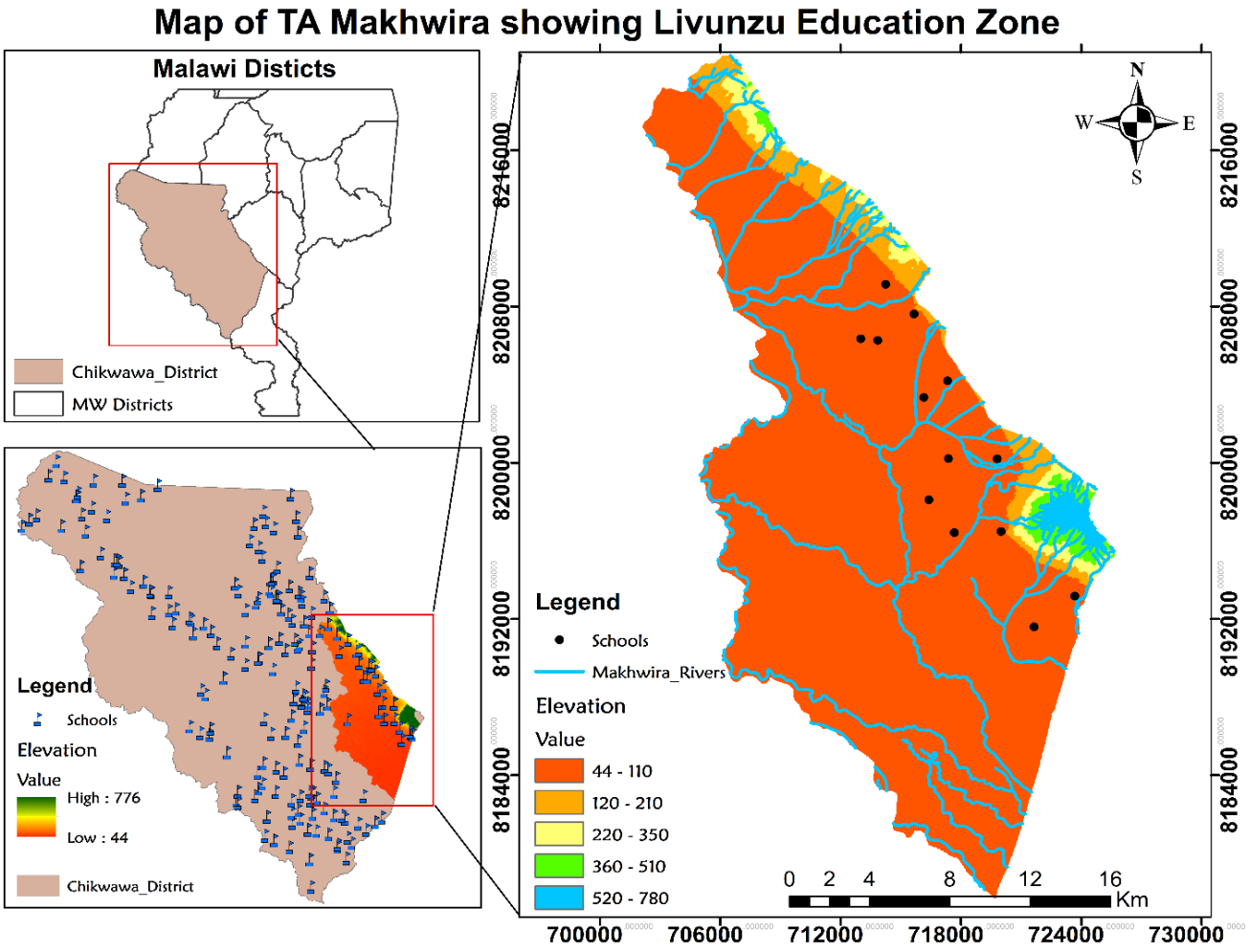


Figure 1: Study area map

The figure above is a map of T/A Makhwira showing public primary schools in Livunzu education zone.

3.1 Research design

Research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis (Creswell, 2009). In order to understand impacts of floods on access to primary education in Livunzu education zone, it was necessary to use descriptive survey design. It permits the researcher to gather comprehensive, systematic and in-depth information about each case of interest (Kothari, 2004). The researcher issued questionnaires to, teachers, learners, and also secondary data from head teachers of the selected schools to solicit desired information.

3.2 Target population

Target population is defined as the set of elements that the researcher focuses upon and to which the results obtained by testing the sample should be generalized (Orodho, 2008). The target population for the study was 13 public primary schools consisting of 598 level seven and eight learners, 13 head teachers and 206 school teachers. The choice of learners considered their age and abilities to provide the information about floods and teaching and learning processes. Their experience to floods of years 2015 and 2019 was also paramount for insightful information.

3.3 Sampling procedures and sample size

This section presents sample size and sampling procedures. In this study, the sample consisted of level seven and eight learners, teachers and head teachers. The sample size of the head teachers, school teachers and learners was determined using the following Yamane's formula.

$$n = \frac{N}{1+N(e^2)}$$

Where:

n = the proposed sample size.

N = the target population which in this case was (13 head teachers, 206 school teachers and 598 level seven and eight students) summing up to 817.

e =the standard error which is a standard value of 0.05.

On substituting $n = \frac{817}{1+817(0.05)^2}$

Calculation of the sample size based on these figures give a sample size of 269.

A sample size of 269 to be distributed proportionately as follows:

Learners $= \frac{598 \times 269}{817} = 197$

Teachers: $=\frac{206\times269}{817}=68$

Head teachers:= $\frac{206\times269}{817}=4$

Table 1: Sample size

Respondents	Target population	Sample size
Head teachers	13	4
Teachers	206	68
Learners	598	197
Total	817	269

Basing on the above breakdown of samples, the study used purposive sampling to identify the 4 head teachers who were given questionnaires. Since 4 head teachers were used in the study, 4 schools in the study area were studied and hence an average of 49 standard (7 & 8) learners per school were used for the study. To choose the 4 schools, simple random sampling was used in which a school with 49 students and above were considered for sampling. The results from the selected schools were generalized with assumption that all schools in the study area experience floods interference.

3.4 Research instruments

The study used both structured open ended and unstructured close ended questionnaires and observation checklist. The questionnaire had three appendices; the **appendix I** was a questionnaire for teachers and had two sections. Section A contained information relating to effects of floods on enrolment and section B contained information on effects of floods on attendance and classroom participation. Whereas **appendix II** was a questionnaire for students and had two sections. Section A consisted of information regarding to coping strategies and section B had effects of flood on attendance and classroom participation. Lastly **appendix III** was a questionnaire for head teachers which had four sections. Section A had information on attendance and enrolment, section B had school coping strategy information, section C contained performance merit sheet in which head teachers were required to fill and section D contained attendance log sheet in which the monthly mean

attendance data for specified time was filled. The observation checklist consisted of information about the catchment characteristics of the study area with respect to flood occurrence, e.g. terrain, vegetative cover, stream networks, stream channels, drainage system, proximity to shire river, land use etc., and flood coping strategies

3.5 Data collection

Data was obtained using the questionnaire, and observation checklist. The appendix III of a questionnaire collected secondary data from head teachers' desks. Distribution of the research instruments was done by the researcher to the respondents. Questionnaires were collected immediately after being filled by the respondents. To ensure a high response rate, the purpose of the study was explained to the respondents, difficult questions clarified and participants assured of total confidentiality. The study used both quantitative and qualitative data. Qualitative data including data for flood damages on school infrastructure was obtained by administration of questionnaire and observation, while quantitative data was captured from secondary data from head teachers' desks. The secondary data captured, targeted years; 2015 and 2019: The attendance data was collected as monthly means in pre-flood season (September, October and November)

and post-flood season (January, February and March). According to the department of meteorological services, (2018), Malawi has a sub-tropical climate, which is relatively dry and strongly seasonal. The warm wet season stretches from November to April during which 95% of annual precipitation take place. This confers with 94% of informants who outlined January, February and March as months in which flood usually occur. The choice of years again considered severity of floods in the area based on record. In these years, Malawi was worst hit by extreme floods with very devastating effects. The study area was also severely affected.

3.6 Data analysis

The study used paired *T* test; a *T* test is a type of statistical test that is used to compare the means of two groups (Craswell, 2009). In this case, the study compared attendance data before the floods and after floods, to establish whether there are significant differences on school attendance of learners before and after floods. The analysis adopted standard test

measure of 95% confidence interval and 5% *alpha level* (α). The following hypothesis tests were used to assess impacts of floods on school attendance:

- Null hypothesis H_0: $\mu=0$: flood occurrence does not significantly affect school attendance
- Alternative hypothesis H_1: $\mu \neq 0$: flood occurrence

  significantly affects school attendance

The following formula can be used to find t-value;

$$t = \frac{(\sum D)/N}{\sqrt{\frac{\sum D^2 - \left(\frac{(\sum D)^2}{N}\right)}{(N-1)(N)}}}$$

Where:

- $\sum D$ =The sum of differences (mean value before flood - mean value after the flood)
- $\sum D^2$ = Sum of the squared differences
- N= Sample size
- t=student's statistical t – test

The calculated t-value is compared with the relevant critical value at a degree of freedom given as (n-1) in stats tables of critical values. When t- value is greater than critical value, the null hypothesis is denied and alternative hypothesis is accepted. Which means flood poses significant effect on attendance. Whereas when t-value is less than critical value, the alternative hypothesis is denied and null hypothesis accepted. Which means flood does not pose any significant effect on attendance.

The data on school performance was analysed using descriptive statistics to compute pass rate change due to flood in schools. The data sets used were pass rates for the first term which was treated as pre-flood data, and pass rates for the second term were treated as post-flood data. The treatments owed to the academic calendar which used to start from

September to December; this season is generally dry. Whereas is in the second term, the area experiences precipitation which may likely trigger floods. The following formula was used:

Pass rate mean change: $$\frac{\overline{X}_1 - \overline{X}_2}{\overline{X}_1} \times 100\%$$

Where:

- $\overline{X_1}$ =mean pass rate for the first term
- $\overline{X}_2$= mean pass rate for the second term

Students enrolment and classroom participation was analysed using descriptive statistics where quantity analysis approach was used to compute frequencies and percentages. Which were presented in graphs and tables. Again qualitative measures such as severe, moderate, were used to explain level of flood damage on various items. Where severe in this study denoted total damage rendering the facility unusable or obsolete loss whereas moderate explained partial damage leading to temporally suspension of use or partial damage.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter focuses on the return rate of questionnaires, data interpretation and discussion of findings. The presentation was done on the research objectives and research questions. The data presented in this chapter were processed using statistical package for social sciences (SPSS).

4.1 Questionnaire return rate

Questionnaire return rate is the proportion of the questionnaires returned after they have been issued to the respondents.

Table 2: Questionnaire return rate

Respondents	Sample	Rate of return	Percentage
Head teachers	4	4	100
Teachers	68	52	76.5
Learners	197	181	91.9
Totals	269	237	268.4

As shown in the table above, there was high respondent return rate. This could be attributed to the use of drop and collect survey theory in which you come face to face with the target key informants (Oundo, 2011). Similarly, the respondents were all found in schools which were fully operational and hence they made it easier to collect all the data without any hitch.

4.2 Impacts of floods on classroom participation

The study sought to determine how floods influenced classroom participation in public primary schools in Livunzu education zone. Missing of classes by learners, missing of teaching duties by teachers, the use of school premises for evacuation centers, whether teaching and learning continued, and the duration in which schools were used as evacuation centers were the variables that were determined and used to measure the influence of floods on classroom participation.

4.2.1 Missing of classes by learners

The study sought to establish impacts of floods on classroom participation by determining proportion of learners who missed classes due to floods. The information was recorded in the table below.

Table 3: proportion of learners who missed classes due to floods

Learners responses		Frequency	Percent
	Yes	154	85.1
	No	27	14.9
	Total	181	100.0

The table above shows that 85.1% of learners missed classes during floods and 14.9% never missed class during floods. This implies that floods affect most students in the zone as they missed with some great deal student- teacher contact hours for classroom participatory activities. The study determined number of factors that led to the missing of classes by learners, classrooms were submerged with flooding water and mud. This made learning space unusable. In this case learners missed classes regardless of their presence at that particular day. Another factor is damaged of bridges and submerged footpaths. Learners could hardly reach out their schools as bridges were either damaged or washed away. Similarly, learners may had found it difficult to move through submerged footpaths and risking their lives. Learners missed classes as a result of their families being displaced with floods. The findings of this study concurs with the study of save the children, (2016) which argued that every year some children lose many precious student-teacher contact hours, which severely impacts educational outcomes and a child's overall development. In the other hand, 14.9% of learners who attended classes might have had the following capacities; age advantage which enabled them to wade through the slippery footpaths and submerged roads, assisted by their parents to wade through the flooding waters, resilient school blocks with minimal exposure to flood hazard and their proximity to schools and

location to areas that need no river crossing when going to school can be some of plus factors that enabled some learners to attend classes.

4.2.2 Missing of teaching duties by teachers

Classroom participation to be effective, there must be a teacher to facilitate lessons' activities and to guide learners into several tasks. In order to determine impact of floods on classroom participation, the study sought to establish the extent to which teachers missed teaching duties as a result of floods. The information was recorded in the table below.

Table 4: proportion of teachers who missed teaching duties due to floods

teachers responses		Frequency	Percent
	Yes	46	88.5
	No	6	11.5
	Total	52	100.0

From the table above, 88.5% of teachers missed teaching duties due to floods while 11.5% never missed their teaching duties as a result of floods. this implied that significant number of teachers were affected by floods and interfered with their teaching service. The failure of teachers to fulfil teaching duties deprived learners of their normal classroom participation leading to the robbing of their precious learning hours. The findings found to be in agreement with Julius, (2008) who discussed that floods not only affect students but teachers may also find themselves absent from work, after being affected by flood hazard. He further argued that, qualified teachers may find it difficult to take up teaching jobs in flood prone regions thus causing perennial shortage of qualified staff.

4.2.3 The use of school premises for evacuation centers

In the cases where teachers turned up for duties and learners for classes, the learning spaces become vital for mutual classroom participation to take place. Classrooms are convenient space for effective teaching and learning processes. The study sought Information to

determine the use of school premises as camping site for displaced people. The study established that 100% of schools were used as evacuation facilities.

The study used school calendars of 2014/15 and 2018/19 school years and flood onset dates to understand whether schools were in session during that time. (Refer appendix IV).

According to the PDNA report of 2015, flooding event started in early January 2015. Leading to the declaration of state of emergency on 13th January by the state president. From the 2014/15 academic calendar, it is evident that floods occurred during the first week of second term. Similarly, PDNA of 2019, indicated that Malawi experienced heavy rains developed from tropical depression namely Cyclone Idai over 5-8 March 2019. The heavy rains triggered floods. From the 2018/19 academic calendar it is also evident that floods occurred when school was in session.

It implied that teaching and learning process was disrupted during the period in which displaced communities occupied learning spaces for shelter. It is likely that there was shortage of learning space and learners were congested in classes since some classrooms were filled by displaced people. This concurs with the findings of UNDP report (2019) which stated that, as some displaced people are sheltering in schools, education of school children has likely been disrupted. Classroom participation was consequently interrupted as overcrowded learners could not interact well with the teacher due to higher pupil-teacher ratio.

Classroom participation can also be interfered with suspension of teaching and learning in the case that displaced communities occupy the entire school premises for shelter. It was also of paramount essence to enquire whether teaching and learning processes continued during the period when schools hosted displaced communities. The study collected the information and it was recorded in table below.

Table 5: teaching and learning progress in schools used for evacuation

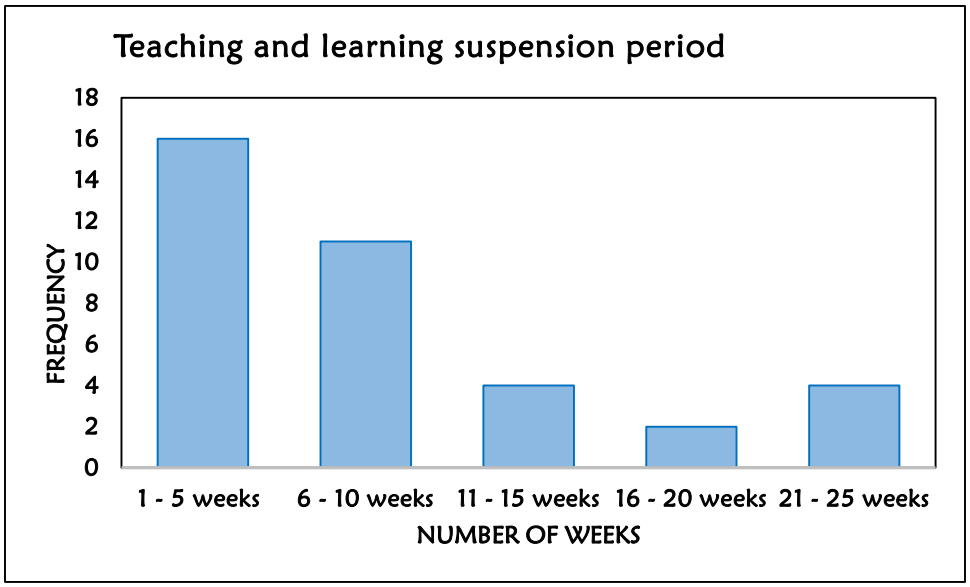
Respondents answers		Frequency	Percent
	Yes	15	28.8
	No	37	71.2
	Total	52	100.0

From the table above, 71.2% of teachers stated that teaching and learning was temporarily suspended for the entire period in which theirs schools sheltered displaced people while 28.8% said teaching and learning continued. The break may expose learners to further harm in their homes for example child labor, sexual harassment and practices leading to high prevalence of early pregnancies and marriage. The argument concurs with international labor organization report of May (2020) which stated that school closures due to COVID-19 has escalated child labor and forced labor. Similarly, on early marriages and sexual harassment, UNICEF report on girl child education of (2020) concurred that, school closures can affect how children use their time. It further argued that girls may spend more time at home and unsupervised, which could increase their exposure to sexual activity, sexual violence, unwanted pregnancies and early marriage. It may also lead to poor syllabus coverage leading to poor performance in national exams (Akello, 2014)

4.2.4 Period in which schools were used as evacuation centers

In the quest to quantify total time in which classroom participation was completely halt as result of flood, the study sought to estimate time in which teaching and learning functions were suspended due to alternative use of classrooms for evacuation facilities. The suspension period was collected and presented in the graph below

Figure 2: Teaching and learning suspension period



From the graph above the following formula was used to calculate weighted mean for the time lost due to the use of classrooms as evacuation space.

$$\overline{x_g} = \frac{\sum \text{frequency} \times \text{class mark}}{\sum \text{frequency}}$$

It was estimated that during the 2019 floods, leaners lost **8.5** learning weeks. It denoted that learners were denied opportunity for classroom participation for such a period of time due to the prolonged use of classrooms as evacuation facilities. It is evident that floods, reduce classroom participation leading to reduced teacher-learners' interactive hours.

4.3 Impacts of floods on attendance

Objective two of the study sought to establish the effects of floods on attendance in Livunzu education zone. To test the objective, the study used quantitative attendance data and the mean averages before floods and after floods were compared using paired t- test analysis. The acquired data sets for attendance was for 2015 and 2019.

Table 6: attendance trend during 2015 flood scenario.

The table below shows the attendance trend during 2015 flood phenomena.

Table 6 (A) paired sample statistics

Paired sample statistics			
	Mean	N	std. Deviation
Mean attendance before 2015 flood	162	32	89
Mean attendance after 2015 flood	92	32	32

Table 6 (B) showing paired sample test

Paired sample test			
Mean attendance Before and after 2015 flood	Mean diff	t-value	Sig(*p-value*)
	70	6	.000

From the table (6B) above, *P- value* <.0001 was calculated. The *p-value* is less than alpha(α) level of 0.05. This test result provided sufficient evidence to deny the null hypothesis and alternative hypothesis was accepted. That means floods significantly lowered the attendance of learners in the second term as compared to the first term where there was no flood.

The findings implied that inconsistent school attendance leads to low performance of learners since learners do not complete syllabus. It has also long term impact on national examinations where such learners may find it difficult to pass.

Table 7: attendance trend during 2019 flood scenario.

Table 7 (A) paired sample statistics

Paired sample statistics			
	Mean	N	std. Deviation
Mean attendance before 2019 flood	178	32	100
Mean attendance after 2019 flood	100	32	48

Table 7 (B) showing paired sample test

Paired sample test			
Mean attendance Before and after 2019 flood	Mean diff	t-value	Sig(*p-value*)
	78	8	. 000

From the table (7B) above, *P- value* <.0001 was calculated. The *p-value* is less than alpha(α) level of 0.05. The test result provided sufficient evidence to deny the null hypothesis and alternative hypothesis was accepted. That means 2019 flood scenario contributed significantly to the dropping of attendance in the second term. The decrease in attendance is one of reasons that led to low learners' performance during terminal assessments. The findings are to some extent in agreement to what Tetteh (2018) investigated that low school attendance negatively affects early grade learners to acquire reading skills which may render them susceptible to failure on future learning objectives.

To verify this, the researcher inquired the information to determine the extent to which floods affect learners' attendance. The results were recorded in table below

Table 8: effects of floods on attendance

Extent on attendance		Frequency	Percent
	MODERATE	1	25.0
	SEVERE	3	75.0
	Total	4	100.0

The above table shows that 75% of head teachers stated that learners' attendance was severely affected by flood while 25% of head teachers stated that floods moderately affected attendance of learners. Severe impact in this case denote a scenario where almost all learners were absent whereas moderate impact explains random absence of learners who were impacted by floods. The information implied that there were severe effects of floods on learners' attendance, the study also sought to determine why attendance of learners significantly dropped due to floods, it enquired to what extent did floods affected classrooms, footpaths, roads and bridges. The results were recorded in the table 4.8 below

Table 9: destruction of school facilities

N=4	Head teachers							
Effect	Classroom		Footpaths		Roads		Bridges	
	F	%	F	%	F	%	F	%
No effect	0	0	0	0	0	0	0	0
Moderate	3	75	1	25	0	0	1	25
Severe	1	25	3	75	4	100	3	75
N=181	Learners							
Effect	Classrooms		Footpaths		Roads		Bridges	
	F	%	F	%	F	%	F	%
No effect	60	33.1	15	8.3	16	8.8	32	17.7
Moderate	14	7.8	45	24.9	20	11.0	20	11.6

Severe	107	59.1	121	66.9	145	80.2	128	70.7
N=52			Teachers					
Effect	Classrooms		Footpaths		Roads		Bridges	
	F	%	F	%	F	%	F	%
No effect	0	0	2	3.8	4	7.7	1	1.9
Moderate	29	55.8	21	40.4	14	26.9	12	23.1
Severe	23	44.2	29	55.8	34	65.4	39	75

The data in Table above, shows that the areas that are severely affected by floods as indicated by the head teachers are footpaths, roads and bridges, 75% of the head teachers indicated footpaths and bridges and 100% roads.

Learners indicated that classrooms, footpaths, roads and bridges were all severely affected by floods. 59.1% of learners indicated classrooms, 66.9% indicated footpaths, 80.2% indicated roads and 70.7 indicated bridges.

Teachers footpaths, roads and bridges as areas which were severely affected by floods: 55.8% of teachers indicated footpaths, 65.4% indicated roads and 75% bridges.

The findings revealed that schools were inaccessible during floods since learners would find it difficult to wading through, submerged roads and footpaths and leading to the dropping of attendance during floods. Bridges were either damaged or washed away disconnecting schools from other parts of communities. The moderate effect on classrooms implied that learners found unsafe and inconvenient to learn in water covered classroom floors which may also result in absenteeism thus dropping attendance of learners. Bridges, roads and footpaths collectively form communication networks, the destruction of these facilities made learners' attendance a challenge.

4.4 Impacts of floods on performance

Table 10: terminal results summary before and after 2015 floods

First term	$\sum$ (pass rate)	Mean pass rate
	1509	47
Second term	1239	39

From the table above, the following formula was used to determine mean percentage change of learner's terminal performance.

$$\text{Pass rate mean change} = \frac{\bar{X}_1 - \bar{X}_2}{\bar{X}_1} \times 100\%$$

$$\frac{47 - 39}{47} \times 100\% = 17.0\%$$

The researcher found that in the second term in which the area experienced floods, the mean performance rate of learners dropped by 17.0%.

Table 11: terminal results summary before and after 2019 floods

First term	$\sum$ (pass rate)	Mean pass rate
	1864	58
Second term	960	30

$$\frac{58 - 30}{58} \times 100\% = 48.3\%$$

Similarly, in 2019 flood case, the researcher found that a second term in which the area experienced floods, the mean performance rate of learners dropped by 48.3%.

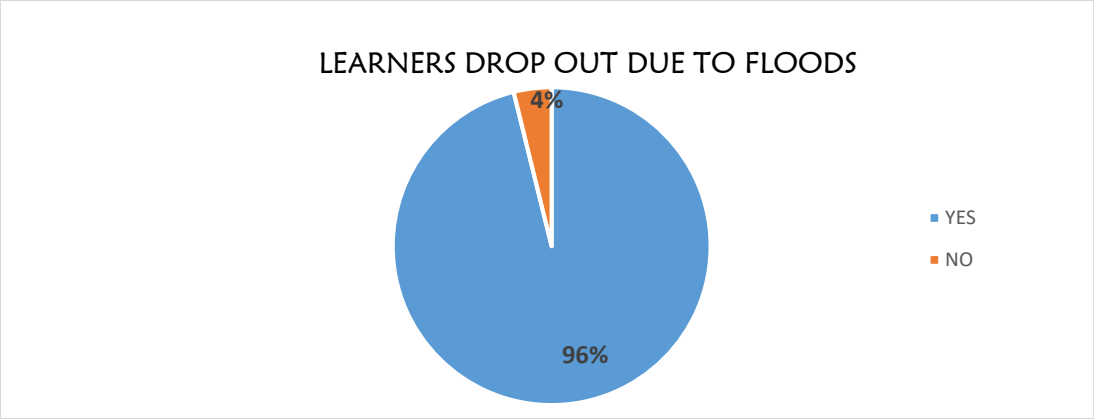
It is a tradition that teachers administer terminal examinations from areas they covered in that particular term, however the performance of learners in Livunzu education zone

dropped significantly despite that learners were mainly tested from what they learnt. The study connected poor performance of learners to psychosocial problems. The death, injuries and displacement of people during floods make learners to have stress and anxiety. Stress, anxiety and general post traumatic disorder affects the memory status of people affected by disasters. According to Robinson and Higgins (2012), one theory as to why victims of disasters have memory problems is that the body releases high levels of the stress hormone cortisol which in turn can affect parts of the brain which are responsible for memory processing. Another theory is that the worry and anxiety caused by the disaster occupy the area of the brain responsible for processing memories. The memory loss is a likely factor that affected performance of learners in Livunzu education zone considering that at primary level learners are mainly tested for their recall abilities. The study additionally sought, to establish some factors with potentials to lower the performance of learners in Livunzu education zone and it enquired the information on effects of floods on exercise books and textbook. 52.5% of learners indicated that floods affect exercises books severely while 11.0% stated that floods affected exercise books moderately. On textbooks, 53.6% of learners indicated that floods affected them severely and 13.3% indicated that textbooks were moderately affected. The results implied that some learners had no reference materials to use in preparation for terminal examinations as their text and exercise books were severely affected by floods which may influence poor performance on examinations and general academic excellence.

4.5 Impacts flood on enrolment

The study sought to determine how floods affected enrolment in public primary schools in Livunzu education zone. Dropout, effects of floods on enrolment were variables used to test the objective. The study determined learners 'drop out proportion and the results were recorded in the graph below.

Figure 3: Drop out of learners due to floods



From the graph above, (96%) teachers stated that learners dropped out of school because of floods while (4%) teachers indicated that learners did not drop out of school due to floods. The researcher enquired the proportion to which learners dropped out of school due to floods. The respondents indicated as the follows.

Table 12: drop out proportion of learners due to floods

Drop out proportion	Frequency	Percent
Very many	22	44
Many	18	36
Not sure	2	4
Few	6	12
Very few	2	4
Total	50	100.0

From the table above 44% of teachers indicated that drop out proportion of learners was very many while 36% stated that many students dropped out due to floods. 4% teachers

indicated that very few dropped out and another 4% stated that they were not sure. Similarly, head teachers were asked to indicate the extent to which floods affected enrolment in their schools. 75% head teachers stated that enrolment was severely affected by floods while one head teacher representing 25% indicated that floods moderately affected enrolment.

The study prompted to establish reason of enrolment drop during floods and information on the same was collected to determine the extent to what floods affected farms and housing. 90% of learners indicated that floods severely affected farms, 88.5% of teachers indicated that there were severe damages of farms due to floods and 100% of head teachers indicated that farms were severely affected by floods. On housing 62.4% of learners stated that their homes were severely damaged by floods while 12.7% stated that floods moderately affected their housing facilities.

The results suggested that some learners might be used to boost labour force in farms after disaster as post- flood recovery farming activities, given that their families rely heavily on agriculture for living and children contribute greatly to household labour force. This may lead to persistent absenteeism resulting to school-drop out. To some learners whose housing were severely affected by floods, they might be displaced to far places where schools become out of reach due to long distances. And again learners may be involved in reconstruction work of their homes a situation which may deter them to resume learning processes, thus escalate drop-out which lowers enrolment.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.0 Summary of the findings

The purpose of this study was to assess impacts of floods on access to primary education in Livunzu education zone. The study was guided by four objectives. The first objective investigated impacts of floods on classroom participation in Livunzu education zone. The following variables were tested; missing of classes by learners, missing of teaching duties by teachers, the use of schools for evacuation centers, continuation of teaching and learning when schools were used for evacuation centers and duration in which schools were used as evacuation centers. The study found that 85.1% of learners missed classes during floods while 88.5% of teachers missed teaching duties due to floods. It was established that sampled schools were used for evacuation centers during flood as indicated by 100% of teachers. 71.2% of teachers stated that teaching and learning was suspended when schools hosted displaced communities which cumulatively, resulted to the estimated loss of 8.5 learning weeks. The findings provide convincing evidence to conclude that classroom participation was significantly affected by floods in Livunzu education zone as a factor of reduced teacher- learner contact hours.

The second objective investigated impacts of floods on attendance in Livunzu education zone. The study found that during 2015 flood scenario the mean attendance difference before and after floods was 70 with significance level of $p<0.0001$. the findings indicated that attendance difference was significant. Similarly, in 2019 flood scenario, the study established that the mean attendance dropped significantly after floods with mean difference of 78. at $P< 0.0001$ significance level. The findings under this objective reveals that schools during floods are inaccessible since floods does not only damage school infrastructure, but also roads footpaths and bridges which are connection networks.

The study also sought to assess impacts of floods on learners' performance. It was found that during 2015 floods event, the performance of learners dropped by 17.9% as compared to the first term of school calendar where there were no floods. Similarly, after 2019 flood

scenario, the performance dropped noticeably with 48.5% as compared to pre-flood first term. The findings revealed that floods negatively affected performance of learners.

Finally, the study investigated impacts of floods enrolment where 96.2% of teachers indicated that learners dropped out of school due to floods. The drop out proportion was that 44% stated that very many students dropped out of school due to floods where as 36% of teachers indicated that many students dropped out of school due to floods. Similarly, 75% of head teachers indicated that enrolment was severely affected by floods and 25% of them indicated that enrolment is moderately affected. The findings denoted that floods lowered enrolment of learners in Livunzu education zone.

5.1 Conclusion

This study concluded that floods affect the learners' classroom participation in teaching and learning functions. This was due to prolonged use of schools as evacuation facilities, learners missing lessons since both teachers and learners were not able to reach school because floods rendered schools inaccessible. The study concluded that learners' attendances, enrolment, quality of learning are all affected by floods. Enrolment was lowered in public primary schools due to floods. The study concluded that this was due to harsh conditions which were caused by floods and fear and school going children to walk through flooded roads and footpaths as well as damaged bridges, and again learners might be involved in post-flood recovery farming activities as locally available labour force which rendered them unable to return to school after its resumption. The study also concluded that the quality of learning was compromised by floods. This was due to the absence of teachers and destruction of learning and teaching infrastructure. The study similarly concluded that teachers' participation in the teaching and learning was negatively affected by floods through causing much teacher absence and lowering the quality of teaching. The study also concluded that floods affected the teaching and learning programmes in Livunzu zone through interfering with the school infrastructure either by destroying or rendering them less useful. These infrastructures included toilets, classrooms, staffrooms and textbooks. This interference was concluded to be a causal factor for poor performance of learners after floods. The study also concluded that floods negatively affected learners'

performance. This was due to memory problems as a function of stress and anxiety which trigger production of stress hormone namely cortisol. Cortisol lowers memory which impeded recall abilities of learners during examinations

5.2 Recommendations

In order to improve the situation, the researcher made the following recommendations based on the research findings.

Psychosocial support should be made available to flood victims including learners soon after floods to avert mental health problems and stress. This may reduce memory problems that impedes performance and entire learners' academic progress.

Government should take a leading role in the construction of bridges and culverts to make schools accessible during rainy season.

The government through department of disaster management affairs and key stakeholders should initiate planning and implementation of construction of evacuation centres in the zone so that schools may not be alternative camping sites. Again the ministry of education and stakeholder should produce a strategic plan to ensure continuation of teaching where schools are used as evacuation centres ie; relief teaching mechanism or education in emergency policy

Government should introduce incentives for the teachers in the flood prone areas of Malawi to motivate them. This can be done by giving them flood risk allowance and putting them on special medical and property insurance schemes. So that the understaffing issues are effectively curbed for effective and efficient teaching and learning.

The ministry of education should engage qualified professionals to assess the structural safety of school buildings, design, construct and maintain school facilities to be resilient in the face of recurrent disasters such as floods and other weather related disasters.

Enrolment and attendance rate may be regular and stable when educational facilities are made available during periods suitable for them for example by closing during floods and opening during the dry season. This can be achieved by making school calendar specific for flood prone areas for example the entire east bank of shire river.

Disaster risk reduction should be integrated in the syllabus. Head teachers, teachers and students should undergo annual training on disaster risk reduction.

The ministry of education should ensure that the safety standards manual requirements are implemented in the schools. To equip both teachers, learners with desirable response behaviors.

5.3 The recommendations for further study

The study can be replicated in other areas that are affected by floods targeting early childhood, secondary and tertiary education. There can be a study focusing on impacts of other hazards like drought and COVID-19 on education attainment.

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APPENDICES

Appendix I: Questionnaire for teachers

Introduction

I am Steven Makhalira, an under-graduate student at Malawi university of science and technology currently pursuing bachelors of science in Disaster Risk Management. The purpose of this questionnaire is to collect data for the study entitled "**impacts of floods on access to primary education**" in Livunzu education zone. This questionnaire will be administered to head teachers, school teachers and learners.

This survey will help determine the effects of floods on access to primary school education. I kindly request you to fill this questionnaire. Do not write your name or the name of your institution. Please answer the questions as honestly and as truthfully as possible by ticking in the spaces provided. The information you give will be treated with utmost confidentiality and will be used for this study only. Thank you for taking the time to complete this survey.

Demographic Information:

1. Male ☐ Female ☐

2. Age range: 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60☐

3.How long have you been in this school?.....

4. Which months of the year are worst affected by floods? Tick below;

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ticks												

Section A: Effects of Flood on Enrolment

5. Did any of your classrooms /buildings collapse due to floods?

Yes ☐ No ☐

6. Did the collapse force you to relocate to a new area?

Yes ☐ No ☐

7. Have you ever transferred from one school to another because of floods?

Yes ☐ No ☐

8. If yes, why? (Indicate main reasons)

- Road impassable☐
- Bridge culvert washed away /submerged ☐
- School submerged/ surrounded by water ☐
- Others? Specify……

9.Are there learners in your school who dropped out of school due to flood?

Yes ☐ No ☐

10. If yes, what proportion?

Very many ☐, Many ☐ , Not sure ☐, few☐, very few☐

Section B: Effect of Floods on Attendance

11. My school building is sufficiently secure and safe for staff and students.

Strongly agree ☐ Agree ☐ Disagree☐ Strongly disagree☐

12. Have you ever missed teaching duties due to flood?

Yes ☐ No ☐

13. if yes, how frequent?

More frequent ☐ , Frequent ☐ , Not sure ☐ , Rare ☐ ,Very rare ☐

14 Have you ever lost teaching and learning resources due to floods?

Yes ☐ No ☐

15. Has your school ever been used; as evacuation center for people displaced by floods?

Yes ☐ No ☐

a). Was learning taking place during that time?

Yes ☐ No ☐

b). For how long was the school used as an evacuation Centre?.....

16. What was the effect of floods on the following facilities?

Area	Level of effect 1=No effect 2=Moderate 3=Severe	Comment
Textbook		
Classrooms		
Latrines		
Boreholes		
Footpaths		
Roads		
Farms		
Bridges		

Appendix II; Questionnaire for learners

This survey will help determine the effects of floods on access to primary school education. I kindly request you to fill this questionnaire. Do not write your name or the name of your institution. Please answer the questions as honestly and as truthfully as possible by ticking in the spaces provided. The information you give will be treated with utmost confidentiality and will be used for this study only. Thank you for taking the time to complete this survey.

Demographic Information:

1. Male ☐ Female ☐

2. Age range: 10-15 ☐ 16-20 ☐ above 20 ☐

3.How long have you been in this school? … … … … … … ..

4. Which months of the year are worst affected by floods? Tick below;

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Ticks												

Section A: Coping strategies

5.Have you ever missed class due to flood?

Yes☐ No ☐

6. If yes, how frequent

More frequent ☐ , Frequent ☐ , Not sure ☐ , Rare ☐ ,Very rare ☐

7. How do you get information about floods?

Fellow students☐ Teachers☐ Media ☐

8. Can you swim? Yes☐ No☐

9. Do you have any flood hazard education at your school?

Yes☐ No ☐

10. In your homes, what effect of floods on the following items

	Level of effect 1=No effect 2=Moderate 3=Severe	comment
Food		
Fuelwood		
Exercise books		
Housing		

Section B: Effects of floods on attendance and classroom participation

11. What was the effect of floods on the following?

Area	Level of effect 1=No effect 2=Moderate 3=Severe	comment
Textbook		
Classrooms		
Latrines		
Boreholes		
Footpaths		
Roads		

Farms		
Bridges		

Appendix III: Questionnaire for head teachers

This survey will help determine the effects of floods on access to primary school education. I kindly request you to fill this questionnaire. Do not write your name or the name of your institution. Please answer the questions as honestly and as truthfully as possible by ticking in the spaces provided. The information you give will be treated with utmost confidentiality and will be used for this study only. Thank you for taking the time to complete this survey.

Demographic Information:

1. Gender: Male ☐ Female ☐

2. Age range: 23-30 ☐ 31-40☐ 41-50 ☐ 51-60 ☐

3. How long have you been in this school? .....

Section A: Flood hazard on attendance and enrolment

4.To what extend did the floods affect:

a) students' attendance in your school?

No effect ☐ moderate☐ severe ☐

b) students' enrolment in your school?

No effect ☐ moderate☐ severe ☐

5. Are there students or teachers who did not return after the floods?

Yes ☐ No☐

If yes specify and explain

Section B. Coping Strategies

6.Have you ever undergone specific training on flood hazard education?

Yes ☐ No ☐ If yes state the year of training……..

7. Briefly explain the main concepts of the seminar.

8. What was the effect of floods on the following;

Area	Level of effect 1=No effect 2=Moderate 3=Severe	comment
Textbook		
Classrooms		
Latrines		
Boreholes		
Footpaths		
Roads		
Farms		
Bridges		

9.For the time you have been at this school, did you have death cases due to floods for both teachers and learners?

Yes ☐ No☐

10.If yes, how many students died of flood? …… how many teachers died of flood? ……

Section. C floods on students' performance

11. This part contains performance merit sheet in which you are asked to fill terminal pass rate percentages as shown in the table below;

Classes	First term pass rate percentages		second term pass rate percentages	
	2014-2015 SCHOOL YEAR	2018-2019 SCHOOL YEAR	2014-2015 SCHOOL YEAR	2018-2019 SCHOOL YEAR
Standard 1				
Standard 2				
Standard 3				
Standard 4				
Standard 5				
Standard 6				
Standard 7				
Standard 8				

Section D. class attendance information

This part contains attendance log sheet in which you are asked to fill attendance of students during pre- and post-flooding seasons for 2015 and 2019 at your school.

2015 FLOOD SCENARIO						
CLASSES	**BEFORE FLOOD**			**AFTER FLOOD**		
	SEPT	**OCT**	**NOV**	**JAN**	**FEB**	**MAR**
Standard 1						
Standard 2						
Standard 3						
Standard 4						
Standard 5						
Standard 6						
Standard7						
Standard 8						

2019 FLOOD SCENARIO						
CLASSES	**BEFORE FLOOD**			**AFTER FLOOD**		
	SEPT	**OCT**	**NOV**	**JAN**	**FEB**	**MAR**
Standard 1						
Standard 2						
Standard 3						
Standard 4						
Standard 5						
Standard 6						
Standard 7						
Standard 8						

Appendix IV: School calendars

2014/2015 ACADEMIC YEAR			
TERM	OPENING	CLOSING	HOLIDAY
1	8th September 2014	12th December 2014	3 weeks
2	5th January 2015	27th March 2015	4 weeks
3	13th April 2015	24th July 2015	5 weeks
2018/2019 ACADEMIC YEAR			
1	10th September 2018	14th December 2018	3 weeks
2	7th January 2019	12th April 2019	2 weeks
3	29th April 2019	26th July 2019	7 weeks

Source: ministry of Education science and technology-Malawi at:

www.moest.starmediamw.com/index.php/academic-calender.html