ENSIGN GLOBAL COLLEGE, KPONG

KPONG, EASTERN REGION

THE EFFECTS OF FLOODING ON EDUCATION IN CENTRAL TONGU AND ADA EAST DISTRICTS OF GHANA

BY

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A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

SEPTEMBER, 2024

DECLARATION

I declare that the information presented in this thesis represents my ideas in my own words except where due reference is made to the original source, I have adhered to the principles of academic honesty and integrity. I further declare that the thesis has not previously formed the basis for the award of any Diploma, Degree or other similar titles of recognition.

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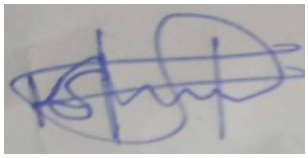

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DEDICATION

This study is wholeheartedly dedicated to the Almighty God for his guidance, strength, protection, power of mind and good health. To my beloved parents and siblings for the source of inspiration and who continually provided moral, spiritual and emotional support.

It is also dedicated to all faculty members, most especially to Dr Sandra Boatemaa Kushitor, for selecting me to undertake this project.

To the most supportive man, Mr. George Annor, my friends, and classmates for their words of encouragement and advice throughout the study.

ACKNOWLEDGEMENT

First and foremost, praises and thanks to the Almighty God for his guidance and blessings throughout the research. I am greatly indebted to my supervisor Dr Sandra Boatemaa Kushitor for the meticulous supervision and guidance throughout the research.

I want to express my gratitude to Engage Now Africa for their support throughout the study.

I am also grateful to Mr Danniku Robert Nobini, Mr MccLord Selasi Azalekor and "The Flood Project Team" for their immense and untiring assistance. My heartfelt appreciation goes to Mr George Annor for his lovely support throughout the study and the research.

FUNDING

Funding for this Master's project (The Mepe project) was provided by Sister Lynette Gay

ABBREVIATIONS

CTDA	Central Tongu District Assembly
GARR	Global Assessment Report on Disaster Risk Reduction
GDP	Gross Domestic Production
GES	Ghana Education Service
GSS	Ghana Statistic Service
KII	Key Informant Interview
MMDAs	Metropolitan Municipal and District Assemblies
NADMO	National Disaster Management
NGOs	Non-Governmental Organisations
WHO	World Health Organisation

ABSTRACT

Background: The possibility of the occurrence of floods have increased due to environmental changes and human activities. These floods have severe impact on human lives and educational infrastructure and activities. The recent floods in Volta and parts of the Greater Accra has impacted livelihood and destructed educational activities. However, the impact of these floods on education has been inadequately investigated. The reports on the floods acknowledges the growing frequency and severity of flooding events in these areas, and present considerable difficulties to local populations and educational institutions. The purpose of this research is to illustrate the education sector's vulnerability in the face of recurring flooding.

Methods: The study used a quantitative cross-sectional approach. The study collected data on the direct and indirect effects of floods on educational infrastructure, student attendance, academic performance, and overall learning environments. A school-based cross-sectional survey was undertaken, with 270 students from two public schools in the Central Tongu and Ada East districts. Stata version 18 was used for data analysis. The results were presented in tables, charts, and graphs. The models will include frequencies, cross-tabulation, and a chi-square values. P-value was determined at 95% confidence intervals

Results: The findings reveal that, 93% of the flooding had impact on schooling in their communities. The floods resulted in the closure of schools while 59% of the students noted that classes were not held during the floods. However, 41.9% reported damage to educational material such as books and laptops. The results of this study presents evidence on flooding for recommendations aimed at improving the resilience of the education system in the face of climate-related difficulties in Central Tongu and Ada East districts of Ghana.

Keywords: flooding, education, health, performance, resilience, impact

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Flooding has become a common phenomenon across the world. Floods, according to the WHO, can inflict widespread destruction, resulting in death and damage to property as well as important public health infrastructure (WHO, 2024). The Earth Network, (2015) defines floods as an overflow of water that submerges land that is usually dry. Floods affected around 3.2 billion people globally from 1990 to 2023 (WHO, 2024). Floods are most likely to affect people who live in floodplains or non-resistant buildings, as well as those who lack warning systems and awareness of the flooding risk (Mensah & Ahadzie, 2020).

Flooding can be divided into three categories: flash floods, river floods, and coastal floods. Flash floods are caused by rapid and severe rainfall, which causes water levels to rise swiftly and can overrun rivers, streams, channels, or highways. River floods occur when a river's capacity is exceeded due to consistent rainfall, snow melt, and dam failure. Coastal floods are caused by storm surges from tropical storms and tsunamis. Floods, droughts, tropical cyclones, heat waves, and severe storms were responsible for 80-90% of all known natural catastrophes over the last decade. Flooding is also becoming more often and intense, and climate change is anticipated to raise the frequency and intensity of extreme precipitation even further.

The SDG target 11.5 states that by 2030, disasters, including water-related disasters, will result in significantly fewer deaths. The people affected will have significantly lower direct economic losses relative to global GDP, with a focus on protecting the poor and people in vulnerable situations (UNSDR 2018). Flooding has a tremendous impact on many facets of

human life, including infrastructure, health, and livelihood (Jerome Glago, 2021). Education is a crucial component of societal progress and is not immune to the disruptive impacts of floods. Flood events can cause widespread damage to educational facilities, disrupt learning environments, and impede access to schooling for affected populations (UNESCO,2020).

Floods are the most common and deadly natural catastrophes, affecting an estimated 250 million people globally each year (UNISDR, 2019). According to UNESCO, floods accounted for over 40% of all-natural disasters from 2000 to 2019, affecting over 1.6 billion people worldwide (UNESCO, 2020). According to the Global Assessment Report on Disaster Risk Reduction (GARR), floods have a particularly significant impact on education infrastructure, with more than 70% of schools in flood-prone areas missing basic resilience measures (UNDRR, 2019).

Ghana is especially prone to flooding, with the National Disaster Management Organization (NADMO) estimating that floods affect 2.3 million people each year. Floods have had a profound impact on the education sector. Flooding has resulted in the destruction of critical educational infrastructure, including classrooms, toilets, and learning materials, severely hampering educational activities (Dumevi et., al 2024).

According to a Ghana Education Service (GES) assessment, floods disrupted approximately 300 schools from 2010 to 2019, disrupting learning for thousands of children (GES, 2020). Furthermore, the World Bank report indicates that flooding has a significant economic impact on Ghana's education system, with infrastructure damage, loss of instructional supplies, and dislocation of students and teachers resulting in long-term educational losses (World Bank, 2018). The Central Tongu District of the Volta Region is prone to flooding, especially during the rainy season, which occurs from April to October annually.

According to the Ghana Statistical Service (GSS), the Volta Region is one of Ghana's most flood-prone regions, with flood occurrences increasing in recent years. While accurate data for the Central Tongu District may be scarce, anecdotal evidence and reports from local officials indicate that flooding substantially influences schooling in the region. The Central Tongu District Assembly (CTDA) states that flooding disrupts school access and ruins educational infrastructure, impeding students' learning processes. Additionally, a qualitative study conducted by a Research Organization/Institution discovered that communities in the Central Tongu district are prone to floods, resulting in temporary school closures and displacement of students and teachers.

This study investigates how flooding affected the education sector in the Central Tongu and Ada East Districts of Ghana. The report acknowledges the growing frequency and severity of flooding events in these areas, which present considerable difficulties to local populations and educational institutions.

Aim: The purpose of this research is to assess the education sector's vulnerability in the face of recurring flooding. It aims to identify particular areas where interventions are required, such as infrastructure improvements, disaster preparedness and response training for educators, and community engagement programs. Furthermore, the study intends to highlight the need to implement climate change adaptation methods in educational programmes

1.2 Problem Statement

Flooding represents a significant environmental hazard with far-reaching consequences, including its impact on educational systems of many countries including Ghana (Munsaka & Mutasa, 2021, UNICEF, 2018).

Flooding significantly disrupts educational outcomes across various regions. The immediate and long-term effects of flooding on education may manifest through decreased school attendance, lower exam passing rates, and increased drop-out rates.

In Bangladesh, flooding led to a 4-9% decrease in public exam passing rates for high school students, with female students particularly affected, showing a 2-percentage point lower passing rate than males (Hoque 2024). In Nigeria, devastating flooding events disrupted children's access to education, impacting their well-being and school attendance, highlighting the need for climate-resistant educational infrastructure (Mfon 2024). A study in Pakistan revealed that 39 out of 1000 children in flood prone areas were not enrolled in any educational institution, with significant drop out rates during the rainy season (Armed et.al, 2024). In India, marginalized children, especially girls, faced disproportionately negative learning outcomes due to flooding, indicating a long-term impact on educational equity (Khalid 2024.)

The effects of flooding on educational infrastructure, student performance, and overall learning outcomes are multifaceted and complex, yet they remain inadequately understood and addressed. While some studies have explored isolated aspects of this issue, a comprehensive understanding of the holistic impact of flooding on education is lacking. Moreover, the exacerbation of flooding events due to climate change further intensifies the challenges faced by educational institutions and communities worldwide (Renaud et al., 2013). Addressing these challenges necessitates a thorough examination of the various dimensions through which flooding disrupts educational processes and undermines the resilience of educational systems (Cutter et al., 2014)

Therefore, this research seeks to investigate the effects of flooding on education, encompassing its impacts on physical infrastructure, instructional continuity, student well-

being, and community resilience. By elucidating the mechanisms through which flooding disrupts educational systems and identifying effective mitigation strategies, this study aims to contribute to the development of informed policies and practices for enhancing the resilience of education in flood-prone regions (Bubeck et al., 2012).

1.3 Rationale of the study

This study assessed the disruption cause by flooding in the normal functioning of schools, leading to interruptions in learning and academic progress. The findings can help policy-makers and educators implement measures to minimize these disruptions and ensure continuity of education during and after flood disasters.

Floods can damage school infrastructure, including buildings, equipment, and learning materials. Researching the resilience of educational infrastructure to flooding can inform investments in building design, maintenance, and retrofitting to enhance resilience and reduce the risk of damage during future flood events. This study will also fill the literature gap on the effects of flooding on education and also serve as a reference point for future studies.

1.4 General objective

To explore the effect of flooding on education in Central Tongu and Ada East Districts, in Ghana

1.5 Specific Objectives

1. To describe specific damage, the flooding has caused to educational infrastructure such as schools, libraries, and other educational facilities.
2. To investigate coping strategies used by schools and educators to cope with the challenges posed by flooding in maintaining educational services

3. To examine the impact of flooding on continuity of learning and education

1.6 Research Questions

1. What specific has the flooding caused to educational infrastructure such as schools, libraries, and other educational facilities?

2. How do schools and educators cope with the challenges posed by flooding in maintaining educational services?

3. To what extent does the flooding disrupt the continuity of learning and education?

1.7 Profile of the Study Area:

The study will be conducted in two districts, Ada East District and Central Tongu district.

Ada East District is one of the 261 Metropolitan Municipal and District Assemblies (MMDAs) in Ghana, and forms part of the 29 MMDAs in the Greater Accra Region. The district is located in the eastern part of the Greater Accra region within latitudes 5°45 south and 6°00 North and from longitude 0°20 west to 0°35 East and west respectively. In the south is the Gulf of Guinea, which stretches over 45 kilometres (27.9 miles). Ada Foah, the district capital is located in the south-eastern part, about 20km off the Accra-Aflao road, along the coast, and about 2 km from the Volta River Estuary. The district shares boundaries with the Central Tongu district to the north, the South Tongu district to the west, the Ada West district to the west, and to the south with the Gulf of Guinea. The population of the district according to the 2021 population and housing census stands at 76,411 with 37,034 males and 39,377 females.

The Central Tongu district is one of the 261 Metropolitan, Municipal, and District Assemblies (MMDAs) in Ghana, and forms part of the 18 municipalities and districts in the Volta Region. The district formerly known as North Tongu has its administrative capital at Adidome which lies within the tropical savannah grassland zone. The Volta River runs from the north to the south of the districts roughly dividing it into two equal parts with each half lying on the banks of the river. The district shares boundaries with Akatsi North District and Akatsi South Municipal to the east, to the south with South Tongu District and Ada East Districts respectively, to the west with Dangme West district and the north with North Tongu Districts. The district covers a total land area of about 706km. The population of the district according to the 2021 population and housing census stands at 83,803 with 39,436 males and 44,367 females. The Ada East District is one of the 261 Metropolitan, Municipal, and District Assemblies (MMDAs) in Ghana, and forms part of the 29 MMDAs in the Greater Accra Region. The District is located in the eastern part of the Greater Accra Region within Latitudes 5°45 south and 6°00 north and from Longitude 0°20 west to 0°35 east and west respectively. In the south is the Gulf of Guinea, which stretches over 45 kilometres (27.9 miles). Ada Foah, the District Capital is located in the south-eastern part, about 20km off the Accra-Aflao road, along the coast, and about 2 km from the Volta River Estuary. The District shares boundaries with Central Tongu District to the north, South Tongu District to the west, Ada West District to the west, and the south with the Gulf of Guinea. The population of the District according to the 2021 population and housing census stands at 76,411 with 37,034 males and 39,377 females

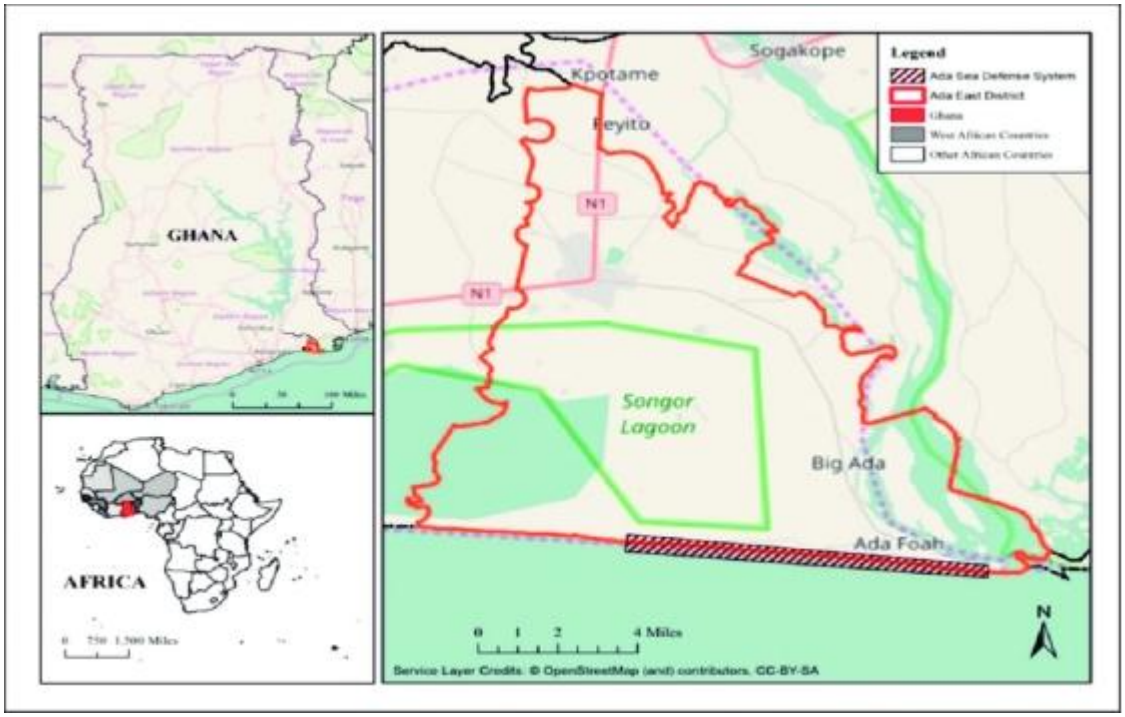

Figure 1. Map of Ada East

Source (Owusu-Daaku & Rosko, 2019)

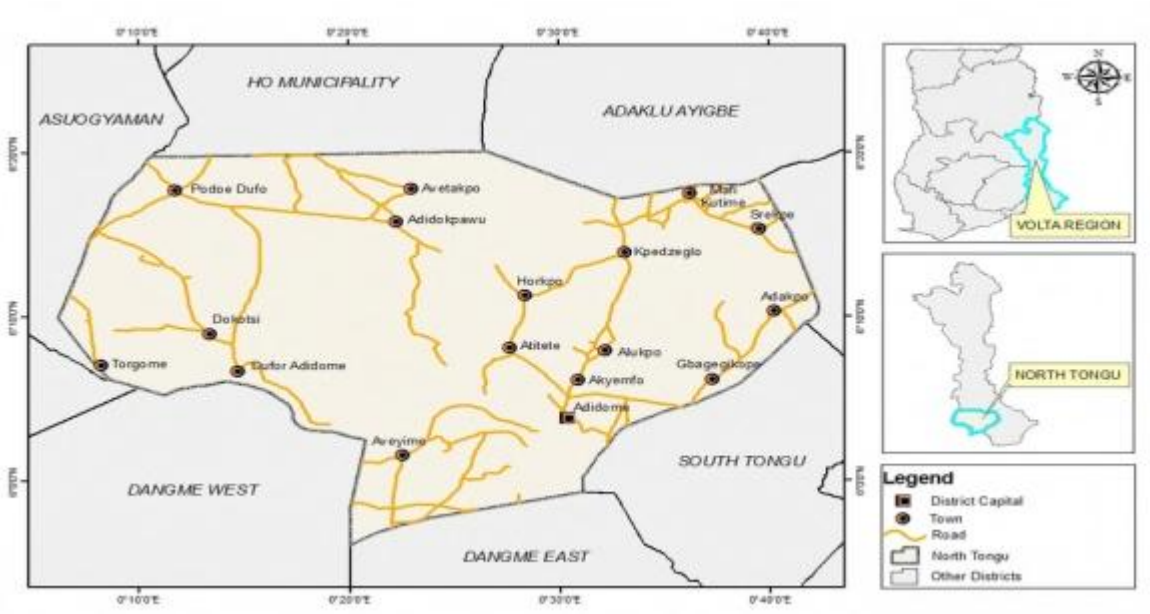

Figure 2.0 Map of Central Tongu

Source:(Tasaime et al., 2016)

The Central Tongu District has a lot of schools, including both public and private schools. At the moment, there are about 135 public schools, which include kindergarten, primary, and junior high schools with enrolment around 50,000 students in the public school from kindergarten to junior high school. Central Tongu District lacks a considerable number of teachers, infrastructure, accessible routes to the various schools among many others.

Ada East District also has a number of schools, including both public and private. There are about 90 public schools in the district, covering kindergarten, primary, and junior high school levels with the number of pupils in the Ada East District is estimated to be around 35,000 within the public schools.

1.8 Conceptual Framework

sustainable livelihood

The livelihoods framework is a tool to improve our understanding of livelihoods, particularly the livelihoods of the poor. It was developed over a period of several months by the Sustainable. Rural Livelihoods Advisory Committee, building on earlier work by the Institute of Development Studies. It organizes the factors that constrain or enhance livelihood opportunities and shows how they relate. It helps to formulate development activities that are people- centred, responsive, and participatory (Serrat, 2017). The Vulnerability Context frames the external environment in which people exist. People's livelihoods and the wider availability of assets are fundamentally affected by critical trends as well as by shocks and seasonality – over which they have limited or no control.

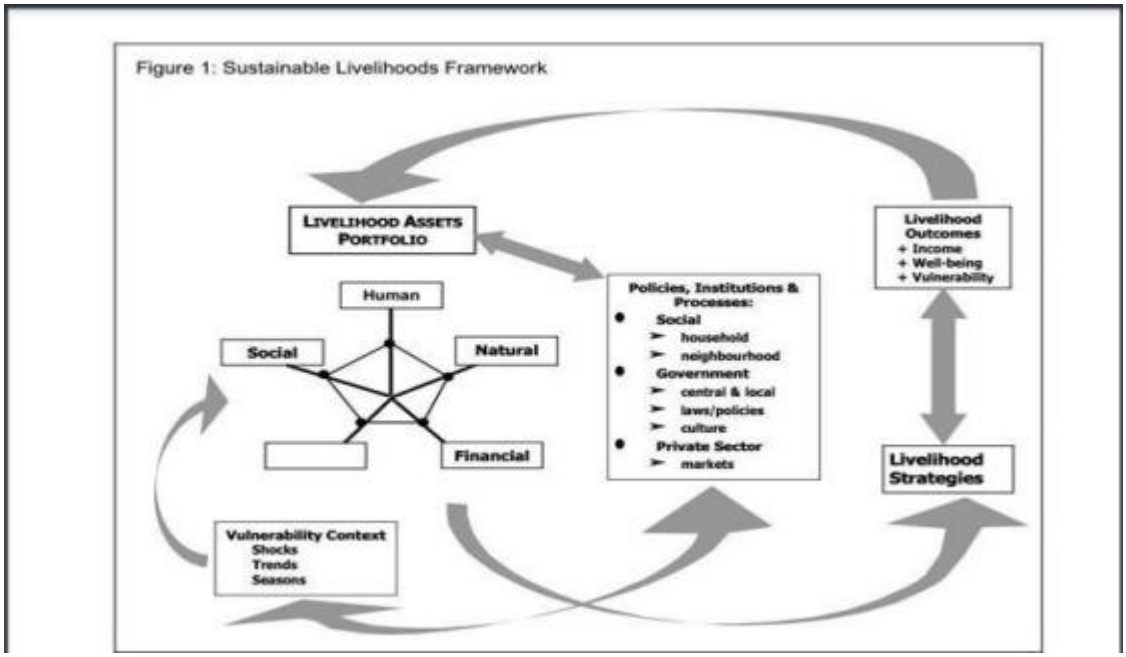

Figure 3.0. Conceptual Framework

Adopted from: Paulson, 2018

By examining these interconnected dimensions, researchers can gain a comprehensive understanding of how flooding affects education in these specific districts of Ghana. The factors that make up the Vulnerability Context are important because they have a direct impact on people's asset status and the options that are open to them in pursuit of beneficial livelihood outcomes. Shocks can destroy assets directly (in the case of floods, storms, civil conflict, etc.).

They can also force people to abandon their home areas and dispose of assets (such as land) prematurely as part of coping strategies (Paulson, 2018). Utilizing the paradigm of sustainable livelihood, this research demonstrates how shocks, such as floods, impact natural capital, which comprises lands, water, and aquatic resources. It also highlights how policies can mitigate these issues to improve livelihood outcomes over an extended period.

1.9 Scope of the Study

The study will be conducted to gain a better understanding of flooding and its effect on educational activities among two districts in the Volta and Greater Accra region, North Tongu, and Ada East respectively. The study will involve taking data from students in schools. The researchers will have an easier time acquiring information as a result of their geographic choices.

1.10 Organization of the Study

This thesis will be sectioned into six (6) chapters. The first chapter is dedicated to the introduction. The context of the study, the statement of the problem, the research questions, the objectives, the conceptual framework within which the study was conducted, and the significance of the study are all clearly stated here. This is expected to act as a precursor to the rest of the research.

The second chapter presents the literature review and describes some of the existing pieces done by other scholars. This chapter contains numerous citations to its important. This chapter also discusses some of the ideas that are guiding contemporary study. It also emphasized some of the limitations of other people's work, emphasizing the importance of looking at current research.

The third chapter deals with the research design and techniques. The research design and research theory are fully explained here. This chapter also discusses how respondents were chosen and how data was gathered. It also considers data analysis tools, and how the processed data will be displayed. This chapter also discusses the research's ethical considerations.

The fourth chapter will contain the findings from the data that was gathered and the discussions given. The findings will be provided in table form, with accompanying graphics if needed. It will present the findings based on the research questions and study objectives.

The fifth chapter discusses the results linking research questions, objectives, key variables, literature reviews and citing the relevant references. The discussion will examine and tie essential concepts to the study's findings. In addition, it gives an in-depth explanation in response to the topic area and aims. All plausible reasons for the various connections, as well as the likely link between variables, will be examined in this section. It will also reveal the present research's strengths as well as its limits.

The sixth and final chapter will discuss general conclusions and recommendations. A summary of the research findings, as well as ideas for future research work from the primary investigator, may be found here.

The references and appendix are also available at the end of the document.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on the effects of flooding on education in central Tongu and Ada east districts of Ghana. Literature specific to floods, and education will be used. Databases used to retrieve literature include HINARI, PUBMED, Google Scholar, Science Direct, and Google Search. Keywords used to retrieve data included but were not limited to the following terms: ‘‘floods”, “education” “schools”, “effect”, “Global OR Worldwide”, “Africa OR Sub-Saharan Africa” and “Ghana”. The literature will be reviewed on the objectives of the study

2.2 Prevalence of flooding

Flooding has become common in every part of the world. The occurrence of floods can be attributed to many factors. A study by Atanga and Tankpa, (2021) in Northern Ghana has revealed that the region experienced an increased frequency of flood disasters related to climate change impacts, negatively affecting food production and food security. The Ghanaian coast is experiencing increasingly frequent coastal flooding due to climate change, affecting more than 40% of the study areas (Brempong et al., 2023). Also, a study by Abass, (2022) has found that urban sprawl-induced green space depletion in Kumasi, Ghana, has led to a 54% increase in impermeable areas and a decline in permeable space, contributing to the worsening flooding situation. Similarly, Rapid and unplanned urban growth, poor waste management culture, and institutional ineptitude are key factors underlying the worsening flood situation in Kumasi, Ghana (Abass, 2022)

The severity of floods has also increased due to many factors. In northern Ghana, the frequency and severity of floods have increased considerably over the last decade, impacting natural resource-dependent communities (Armah et al., 2010). Many Female headed households and those with a college education in Ghana are more likely to underestimate their vulnerability to floods compared to male-headed households and those with no education (Christian et al., 2021). Recurrent flooding in Old Fadama, Ghana, leads to adverse physical and mental health impacts, with vulnerability differentiated based on gender, age, housing, class, and income (Adams & Nyantakyi-Frimpong, 2021) Households' assets most vulnerable to flooding in Ghana include farmlands, human health, housing, and financial savings, with gendered and differentiated effects (Afriyie et al., 2018)

Addressing flooding and its impact on livelihood requires a collective effort. Echendu, (2020) Nigeria's flooding problem is mainly man-made and requires collaborative action to address it and achieve the Sustainable Development Goals. Ghanaian flood risk management strategy needs further development, as it has become a recurring phenomenon causing flooding in major cities and conurbations on an unprecedented scale (Ahadzie & Proverbs, 2011). Addressing the occurrence of these floods and their impact requires town planning institutional efforts.

2.3 Causes of floods in Ghana

Floods are ideally, natural disasters, however, many factors in Ghana and around the world have been linked to the perennial increase in floods. Several studies have identified man as the cause of these floods. For example, a study by in Ghana Mensah and Ahadzie, (2020) found that poor urban planning and development, poor and inadequate drainage facilities, poor environmental attitude, and extreme rainfall are the top causes of urban flooding in

Ghana. Similarly, a study by Ntajal et al., (2022) has noted that poor land use planning and solid waste disposal are key risk factors contributing to flooding in Ghana, contributing to water pollution and disease outbreaks. In addition, rapid and unplanned urban growth, poor waste management culture, and institutional ineptitude are key factors causing the worsening flood situation in Kumasi, Ghana (Abass et al., 2020)

The natural causes of these floods cannot be overlooked. Campion and Venzke, (2013) found that bad spatial development practices and lack of rainfall in March and November are causes of floods in Kumasi, Ghana. In addition, Annual occurrences of floods in Accra, Ghana, are caused by stormy rain, drought, and bushfires, with the worst affected areas being slums and urban poor (Okyere et al., 2013). Also, (Sarkodie et al., 2016) found that flash floods in Accra are caused by intense rainfall events in eight drainage basins due to short response time and high specific peak discharges.

2.4 Flood damages in the educational Sector

Floods pose a risk to not only human settlements but educational and other institutional facilities as well. This is because educational facilities are located in communities that are prone to floods and will likely be affected in case floods occur. Flooding poses a significant threat to educational facilities, with the potential to cause extensive damage and disruption to schools, libraries, and other educational institutions. Flooding can cause damage to architectural heritage and historic infrastructure, including schools, libraries, and other educational facilities (Drdácký, 2010). A study by Yousefi et al., (2020) reported that 492 rural schools and 147 urban schools in Chaharmahal and Bakhtiari Province, Iran, are in very high-risk locations due to floods.

The impact of flood disasters on these vital community resources can have far-reaching consequences, affecting the educational opportunities and outcomes of students, as well as the ability of educators to deliver their services effectively (Convery et al., 2015). Residential structures are particularly vulnerable to the effects of flooding, whether from storm surges, heavy rainfall, or levee failures (Jordan & Rogers, 2012). The forces of floodwaters can cause severe structural damage, soil saturation, and environmental contamination, all of which can render a building unusable or require extensive repairs. Similarly, educational facilities are at risk of these same hazards, potentially leading to the loss of crucial learning materials, technology, and physical infrastructure (Convery et al., 2015). Beyond the direct physical damage, floods can also disrupt the normal operations and services of schools and libraries.

The displacement of students and staff, as well as the loss of essential records and resources, can significantly impair the ability of these institutions to fulfil their educational mission. Furthermore, the strain on public services and infrastructure in the aftermath of a flood event may limit the ability of school districts and local governments to provide the necessary support and resources to reopen and restore damaged educational facilities. In India, most prominent libraries in Kashmir were severely damaged during the September 2014 floods, highlighting their inefficiency and incapability to cope with disasters (Wani & Ganaie, 2017).

Floods cause high rates of damage to educational facilities, particularly classrooms, and are associated with less optimal student learning outcomes and higher numbers of students repeating a grade (Ruhyana & Aeni, 2019). In most cases, 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 (Mudavanhu, 2014)

2.5 Coping mechanisms used by the educational system to contain challenges posed by floods

The educational system employs coping mechanisms to address challenges posed by floods, focusing on disaster risk reduction education, self-regulation, and sustainable development strategies. Being aware of floods and its impact helps people to cope when it occurs. According to Jelena, (2022) disaster risk reduction education is crucial for preparing individuals to respond to floods effectively

Building flood resistant school structures helps to mitigate the impact of the floods. According to Shah et al., (2020), schools can reopen promptly following a disaster by incorporating characteristics that are resistant to flooding into their design. This can greatly lessen the impact of floods. Also adopting electronic learning could support education as at the time the floods occurred. Anderson & Dron, (2011) e-learning platforms provide flexible and accessible learning opportunities, allowing education to continue uninterrupted during emergencies.

Coping with these disasters requires collective efforts. For instance, community involvement guarantees a coordinated response to flooding and improves the educational system's overall resilience (Takenouchi & Yamori, 2020). Also, Self-regulation and coping strategies play a significant role in enhancing students' ability to manage stress during educational activities, especially in challenging conditions like floods (Kalamazh et al., 2023).

Additionally, sustainable development approaches, such as using innovative tools like poetry, and music, and educational blogs, are utilized to educate communities and institutions on adapting to and mitigating the impacts of flooding for sustainable development in Nigeria's

educational sector (Anabaraonye et al., 2022). By integrating these mechanisms, the educational system can better contain the challenges posed by floods and promote resilience within communities and institutions.

2.6 Impact of flooding on Continuity of learning and Education

Flooding's effects on the continuation of education and learning are a major global concern. The research exposes several important topics, such as the escalation of educational inequality, psychological consequences on pupils, infrastructural destruction, and displacement. The main ideas from the literature are summarized below.

Floods have the power to demolish school buildings, curriculum, and necessary infrastructure, which interferes with instruction. These closures cause kids to miss out on important learning opportunities and may have long-term negative effects on their academic performance (Mir et al., 2023)

Exposure to floods reduces the number of completed grades and school enrolment in Ethiopia, India, and Vietnam, and has a more harmful effect on children's education than droughts, frosts, and hailstorms. (Nguyen & Minh Pham, 2018). Severe flooding in Thailand negatively and significantly affected test scores for grades 6 and 9, except for social studies, and had no significant effect on grade 12 (Thamtanajit, 2020). Flooding has a devastating impact on education systems in Africa, and the adequacy of states' responses to prevent it question (Munsaka & Mutasa, 2021)

Flooding frequently makes already-existing educational disparities worse. Poorer communities are disproportionately affected by floods because they frequently lack adequate infrastructure and resources. According to research by (Muttarak & Lutz, 2014) children from these communities have more challenges while trying to resume their schooling after the

disaster. The educational divide between various socioeconomic categories is widened by this discrepancy.

Families are frequently uprooted by flooding, which interferes with the continuation of education for pupils. Students who are displaced may enrol in multiple schools, which could result in irregularities in their education. Displaced students have a variety of difficulties, as mentioned by Binder et al. (2015), such as adjusting to new curricula, problems with social integration, and loss of academic progress (Loughran et al., 2019)

Peek and Richardson (2010) point out that children may experience trauma and stress as a result of natural catastrophes, such as floods, which can negatively impact their capacity to focus and learn. For studying to be effective, pupils' mental health is crucial, and floods can seriously harm this element (Peek et al., 2018)

Floods directly impact the performance of students, mainly at the secondary level, and reduce the quality of education, disrupting access to education rights (Chaudhary & Timsina, 2018). The Battle of Flooding Protection learning package significantly improves students' disaster prevention skills, interest in learning, self-awareness, and sense of civic responsibility (Tsai et al., 2020). Reintegrating children and families into community structures like schools as soon as possible after a flood is important, as is creating safe spaces for pupils to explore their flood experiences (Williams et al., 2017)

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter described how the research problem was investigated and why particular designs and techniques were used. The chapter also describes the setting in which the study was carried out, the sampling and sample size, the tool for the data collection, the data gathering procedure, the analysis, and the results of the study

3.2 Study Design

This study adopted a quantitative research approach using a cross-sectional survey design. A cross-sectional survey was employed to allow for the collection of numerical data, making it easier to quantify and measure the impacts the spillage caused on education at the time. A cross-sectional study design wase used because the two schools in both districts were contacted at only one point in time. The main advantage of this research design is that it allows for gathering relatively large data within a short period.

3.3 Study Sites

The study site for this project was the Central Tongu District in the Volta Region and the Ada East District in the Greater Accra Region of Ghana. Specifically, the basic schools (Awadiwoekome R/C Basic School,nTogbui Aho Memorial School in the Central Tongu District of the Volta Region and Pediatorkorpe Basic School in the Ada East District of the Greater Accra Region) in the two affected communities of the two selected districts formed the study site.

3.4 Study Population

Schoolchildren between the ages of 8 and 16 and educational workers from the three basic schools stated above were the population for the study. These three basic schools have pupils and educational workers who are likely to have experienced the impact and the disruption of the flood and its related challenges and thus, are suitable for the current study.

3.5 Sampling Technique and Sample Size

Taking into consideration that the study population is well-defined, and the study is a cross-sectional study, the researcher had used a stratified sampling technique to select participants from all the three basic schools in the affected areas of the Central Tongu and Ada East Districts respectively. A stratified sampling technique has been used to select participants based on their gender, age, and class levels. Also, the purposive technique will be employed because the participants are selected as they have the characteristics that the researcher needs in the sample.

The sample size was calculated using the formula by Snedecor and Cochran (1989).

$$n = \frac{Z^{\alpha}/_{2} * P(1-P)}{d^2}$$

Where, n = required sample size,

[$Z^{\frac{\alpha}{2}}$] = reliability co-efficient,

p = proportion of study population

d = margin of error

$[Z_{\frac{\alpha}{2}}]$ = 1.96 at 95% confidence level

p = 80% or 0.8

d = 5% or 0.05

p= [1.96]

$$n = \frac{(1.96)^2 * 0.8(1-0.8)}{0.05^2}$$

n=

$$\frac{3.8416 * 0.16}{0.0025}$$

n=246

With a non-response rate of 10% (24), a total of 270 participants will be required

SCHOOLS	ENROLLMENT (UPPER PRIMARY AND JHS)	REQUIRED SAMPLE SIZE
Awadiwoekome Basic School	150	(150/500) *270=81
Tobui Aho Memorial School	100	(100/500) *270=54
Pediatorkorpe Basic School	200	(200/500) *270=108
Educational Workers	50	(50/500) * 270=27
TOTAL	**500**	**270**

3.6 Pretesting

Pretesting of the questionnaire was done at Awadiwoekome Basic School. Results from the pretesting was included in the main study. The pre-test made it possible to test the participants' level of understanding of the questionnaire and necessary corrections and updates made to the questionnaire after each day's work.

3.7 Data Handling

Data collected with questionnaires has been screened for completeness and errors. The principal investigator has been responsible for data cleaning and management. The original

entry on the questionnaire was used as a source of data. Soft copies of all datasets and work done have been sent to my supervisor by e-mail and all completed individual questionnaires have been kept under lock and key also at the Ensign library for ten years.

3.8 Data Analysis

Data collected has been analysed using STATA, version 18.0. Descriptive statistical analysis was carried out to obtain summary tables containing the demographic characteristics of the study participants. Odds ratios ORs, reported with their 95% confidence intervals (C.I) with the level of statistical significance will be set at $p<0.05$ for all tests. The results were expressed as means, frequencies and percentages.

3.9 Ethical Considerations

Ethical approval for the study was obtained from the Ethical Review Committee of Ensign College of Public Health (ENSIGN/IRB/EL//SN-267/01) before the study begun.

Oral informed consent was sought from participants after explaining the study to them before recruitment. Furthermore, this research has sought the consent of participants by asking them to sign a consent form. Participants were made aware of the objectives of the research project, and they were assured of anonymity and confidentiality for all information they provided. Participants were also assured that at any point during the data collection they have every right to withdraw without any consequences to their person, image, or self-esteem. Data collected will be kept for ten (10) years.

3.10 Limitations Of The Study

Lots of the students dropped out of school and some relocated to higher grounds and other communities making it impossible to meet the targeted sample size.

Some pupils and educational workers did not want to grant us audience during the questionnaire administration. Most of the participants thought we were working for the government which has never supported them but always comes to collect data.

The cost of transportation and accessibility to the villages was also a challenge causing much demands for a lot of time and resources in order to write a comprehensive report.

Most pupils within some schools (especially Pediatorkorpe) who were not part of the sample were ever ready to part take in the study because they thought there as compensation causing delay in data collection process.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This section presents findings and analysis of results. The data was analysed using Stata version 18. The analysis is in line with the stated aims of the study. The analysis consists of descriptive statistics of the demographic characteristics of the respondents. The results of the study are presented in tables.

4.2 Socio-demographic characteristics of the school children

The study population consisted of schoolchildren from Greater Accra (64.71%) and Volta (35.29%) as shown in table 4.1. The sample was evenly split between male and female participants (50% each), and the average age was 13.09 years. A considerable proportion of the children (44.38%) lived with family members other than their parents, indicating potential home instability or parental absence.

Most homes had more individuals living together (mean of 7.18), and an alarming 83.09% reported having less money than they required. Both fathers and mothers in these homes had low levels of education, with a sizeable proportion (31.62% of fathers and 33.82% of mothers) lacking formal training. This socio-economic backdrop presents a challenging setting for the youngsters, especially in the context of flooding.

Table 4.**1 Socio-demographic characteristics of the school children**

Variable	Frequency (n)	Percentage (%)
Region		
Greater Accra	88	64.71
Volta	48	35.29
District		
Ada East	88	35.3
Central Tongu	48	64.7
Age in years		
9-11	29	21.3
12-14	64	47.1
15-19	43	31.6
Mean age	Mean= 13.09	SD= 2.29years
Sex		
Male	68	50.00
Female	68	50.00
Who participants live with at home		
Both Mother and Father	56	41.18
Mother	29	21.32
Father	6	4.41
Another family member	59	44.38
A sibling	26	19.12
Number of people participants live with at home	Mean = 7.18	SD = 3.43
Household income		
Just enough money	23	16.91
Less money than you need	113	83.09
Father's level of education		
Don't know	13	9.56
No formal education	43	31.62
Primary	24	17.65
JHS	27	19.85
Secondary	24	17.65

Tertiary	5	3.68
Mother's level of education		
Don't know	8	5.88
No formal education	46	33.82
Primary	30	22.06
JHS	36	26.47
Secondary	16	11.77
Means of transport to school		
Canoe	12	8.82
Walking	124	91.18
Distance from house to school		
Near	29	22.84
Very near	12	9.44
Far	41	32.28
Very far	45	35.43
Food security		
Yes	51	37.50
No	85	62.50
Grade		
Basic 4	42	30.88
Basic 5	5	3.68
Basic 6	41	30.15
JHS 1	18	13.23
JHS 2	11	8.09
JHS 3	19	13.97
Class size	Mean = 30.42	SD = 8.66

4.3 Association between socio-demographics of participants and district of students

The table 4.2 below presents the relationship between different variables (such as sex, age, household income, mean of transport, food security, distance to school and grade) and the district (Central Tongu and Ada East). The results include cross-tabulation, chi-square (X^2)

values and P-values to determine the statistical significance of these relationships. The results from this study indicates that, **sex**, **age**, **distance to school**, and **grade of student** were statistically significant at (0.048, 0.011, 0.000, and 0.023) respectively.

Table 4.2 Association between Socio-demographics of participants and district of students

Variable	District		X^2	P-value
	Central Tongu	**Ada East**		
Sex				
Male	30 (44.1)	38 (55.9)	4.63	**0.048**
Female	18 (26.5)	50 (73.5)		
Age				
9-11	5 (17.2)	24 (82.8)	9.05	**0.011**
12-14	21 (32.8)	43 (67.2)		
15-19	22 (51.2)	21 (48.8)		
Household income			0.003	0.955
Just enough	8 (34.8)	15 (65.8)		
Less than enough	40 (35.4)	73(64.6)		
Number of people in household			0.485	0.922
≤ 5	16 (36.4)	28(63.6)		
6-10	26(33.8)	51 (66.2)		
11-15	4 (36.4)	7 (63.6)		

16+	2 (50)	2 (50)		
Means of transport.			0.234	0.424
Canoe	5 (41.7)	7 (58.3)		
Waking	43 (35.3)	81 (65.7)		
Distance to school			29.68	**0.000**
Far	17 (41.5)	24 (58.5)		
Near	2 (6.9)	27 (93.1)		
Very far	18 (40)	27 (60)		
Very near	2 (16.7)	10 (83.3)		
Food security			2.198	0.138
Yes	34 (40)	51 (60)		
No	14 (27.5)	37 (72.5)		
Grade of student			5.175	**0.023**
Primary school	25 (28.4)	63 (71.6)		
JHS	23 (47.9)	25 (52.1)		

4.4 Flooding experience and education impact

This study also assessed the impact of flooding on education. The findings show that floods have a considerable negative influence on education in the towns surveyed. The overwhelming majority (93.38%) noted that flooding had an impact on schooling in their community. The floods forced schools to close, with 59.23% reporting that classes were not held during the floods. The primary causes for school closures were inaccessibility, the use of schools as shelters, and the necessity to clean up after floods. Regular classes were cancelled for 68.46% of pupils, and a substantial proportion (50.53%) could only return to school one

to two weeks after the disaster, while 34.74% took longer. This disturbance unavoidably damaged the continuity and quality of schooling.

Table 4.3 Flooding experience and education impact

Variable	Frequency (n)	Percentage (%)
Flooding affected education in your community		
Yes	127	93.38
No	9	6.62
school in session during the flood		
Yes	53	40.77
No	77	59.23
Why school was not in session		
Clean up after flooding	2	3.77
School not accessible by students and teachers	14	26.42
School used as shelter	5	9.43
None	32	60.38
Classes cancelled due to the flood		
Yes	89	68.46
No	41	31.54
Duration after flood to school resumed		
Less than a week	14	14.74
One to two weeks	48	50.53
More than two weeks	33	34.74

4.5 Impact of flooding on school infrastructure

Flooding had an impact on school infrastructure as well. However, more than half (55.15%) of respondents said it had no effect. About, 41.91% reported damage to educational materials such as books and laptops. The destruction included school grounds, furniture and instructional equipment, further straining the educational environment. Activities to repair or

restore school infrastructure were modest, with only 17.65% of respondents reporting such activities. Moreover, half (53.68%) of students reported changes in the frequency of homework

table 4.4. Impact of flooding on school infrastructure

Variables	Frequency (n)	Percentage (%)
Effect of flooding on infrastructure of your school		
None	75	55.15
Not sure	5	3.68
Partial	46	33.82
Significant	10	7.35
learning materials been damaged due to flooding		
Yes	57	41.91
No	70	51.47
Don't know	9	6.62
Materials destroyed due to the flood		
School garden	31	22.79
Furniture	23	16.91
Computers	7	5.15
Other electronic assets	1	0.74
Student projects	7	5.15
Teaching materials	44	32.35
School building (walls)	27	19.85
None	65	47.79
efforts to rehabilitate or rebuild school infrastructure after flooding		

Yes	24	17.65
No	82	60.29
Don’t know	30	22.06
damages that has been restored		
School garden	1	3.33
Furniture	5	16.67
Computers	0	0.00
Other electronic assets	0	0.00
Student projects	0	0.00
Teaching materials	18	60.00
School building (walls)	6	20.00
None	3	10.00

4.6 Effect of flooding on academic activities

A total of 136 students were assessed on how their homework was affected due to the floods. Among them, 73 students (53.68%) reported that the frequency of their homework was affected, while 63 students (46.32%) indicated that it was not affected. Regarding the frequency of homework assignments, the majority of the students (49.26%) 67 reported receiving homework every day, and 59 students (43.38%) reported receiving homework once a week. Also, receiving homework less than once a week, and reported never receiving homework represented 5 students (3.68%) each.

With regards to people who assist them with their homework currently, 70 students (54.69%) reported being assisted by a sibling, none of the students (0.00%) reported being assisted by a teacher, while 3 students (2.34%) reported being assisted by someone else. The findings also

indicate that 70 students (51.47%) reported missing no school days, 50 students (36.77%) reported missing between 1 and 5 days, and 16 students (11.77%) reported missing more than 5 days.

All 136 students (100%) reported the presence of a blackboard or whiteboard in their class. Majority of the students 55 (40.44%) reported that the term was cancelled, on 9 students (6.62%) did not know.

Table 4.5 Effect of flooding on academic activities

Variable	Frequency	Percentage
Frequency of homeworks affected due to the floods		
Yes	73	53.68
No	63	46.32
Frequency of homework for school		
Everyday	67	49.26
Once a week	59	43.38
Less than once a week	5	3.68
Never	5	3.68
Person who assists with your homework now		
No one	46	35.34
Sibling	70	54.69
Parent	12	9.38
Teacher	0	0.00
Other	3	2.34
how many school days did you miss		
None	70	51.47

Between 1 and 5 days	50	36.77
More than 5days	16	11.77
Number of class/subject teachers had before the flood		
One	106	82.81
Two	15	11.72
Others	7	5.47
Number of class/subject teachers currently present		
One	105	82.03
Two	14	10.94
Others	9	7.03
Presence of blackboard or whiteboard in your class		
Yes	136	100.00
No	0	0.00
school term affected due to the flooding		
Yes, it was extended	24	17.65
Yes, it was cancelled	55	40.44
No, it had no effect	48	35.29
Don't Know	9	6.62
end of term exam affected during the period of flooding?		
Yes, it was cancelled	32	23.53
Yes, it was delayed	42	30.88
No, it had no effect	52	38.24
Don't know	10	7.35

4.7 Coping Mechanisms and Community Response

The shut down of schools forced pupils to use a variety of coping techniques. A sizeable fraction (36.77%) missed classes, and 33.09% had to shift to different schools. The coping tactics were ineffective, with only 17.65% of respondents rating them as effective in maintaining educational continuity.

Table 4.6 Coping mechanisms and community response

Variables	Frequency (n)	Percentage (%)
Learning approach during the closure of the school period		
I had no contact with my teacher	11	8.09
My siblings provided lessons	26	19.12
No lessons	50	36.77
Relocated to a new school	45	33.09
Teacher provided virtual lessons	2	1.47
Went to teachers' house	2	1.47
Effectiveness of coping mechanisms in maintaining educational continuity during and after flooding incidents		
Not effective	25	18.38
Not sure	20	14.71
Not very effective	31	22.79
Somewhat effective	36	26.47
Very effective	24	17.65

4.8 Psychological Effects of Flooding

The floods had a significant psychological impact on the youngsters. More than half (61.03%) experienced trouble sleeping and intrusive thoughts about the flooding. 38.23% of responders

reported panic attacks, while 24.27% had terrible dreams about the event. More serious consequences, such as increased use of alcohol or drugs, were uncommon (1.47%).

Psychological discomfort also impacted academic performance, with 50% expressing difficulty concentrating. Despite these obstacles, the vast majority (88.97%) were able to pay attention in class, and 94.85% were eager to return to school. Interestingly, the flooding had no major impact on the children's future objectives, with 90.44% reporting no change in their plans. However, 41.18% were concerned that further flooding disasters might hinder them from accomplishing their goals.

Table 4.7 Psychological effects of flooding

Variables	Frequency (n)	Percentage (%)
Sleeping problems		
Yes	53	61.03
No	83	38.97
Pictures in my head of what happened; feels like it's happening right now		
Yes	53	61.03
No	83	38.97
Increased tension in relationship (eg. more arguing)		
Yes	2	1.47
No	134	98.53
Anger or tantrums		
Yes	20	14.71
No	116	85.29
Panic attacks		
Yes	52	38.23

No	84	61.77
Bad dreams reminding me of what happened		
Yes	33	24.27
No	103	75.73
Increased use of alcohol or drugs		
Yes	2	1.47
No	134	98.53
Thought of suicide		
Yes	9	6.62
No	127	93.38
Lack of energy		
Yes	1	0.74
No	135	99.26
Staying away from anything that reminds me of what happened (people, places, things, situations, talks)		
Yes	12	8.82
No	124	91.18
No psychological health effect of the flooding		
Yes	28	20.59
No	108	79.41
Have these effects interfered with your school work		
Yes	68	50.00
No	68	50.00
Able to pay attention in class after the flood		
Yes	121	88.97

No	15	11.03
Worried if there is another flooding incident parent would be unable to take care of you		
Yes	91	66.91
No	45	33.09
Excited to come back to school after the flooding incident		
Yes	129	94.85
No	7	5.15
Parents willing to allow you come back to school after the flooding incident		
Yes	133	97.79
No	3	2.21
Future plans before the floods		
Doctor	14	10.94
Nurse	39	30.47
Police	5	3.91
Soldier	32	25.00
Teacher	16	12.50
Others	22	17.19
Have they changed		
Yes	13	9.56
No	123	90.44
Do you fear that the incident of another flood will prevent you from achieving these plans		
Yes	56	41.18
No	80	58.82

CHAPTER FIVE

5.0 DISCUSSION

5.1 Effects of Floods On Education

The data show that flooding considerably interrupts education in the assessed towns. An astounding 93.38% of respondents stated that floods had a negative impact on education, with schools frequently being forced to close during such storms. This finding is in line with a study by Nguyen and Pham (2018), which noted that exposure to floods reduces the number of completed grades, school enrolment, and cognitive ability scores of children in Ethiopia, India, and Vietnam. This high percentage demonstrates the pervasiveness of the problem and the school system's vulnerability to environmental shocks. This might be due to the fact floods are emergencies, and it take quite more resources to get temporal means to replace the existing school systems.

The main reasons for school closures were inaccessibility, the conversion of school buildings into shelters, and the need for substantial clean-up activities following the floods. This finding corroborates with a study by Ahmed (2022) Which noted that the 2010 floods in Pakistan seriously disintegrated the education sector, with physical reconstruction and teacher training programs being major components of the recovery strategy.

In contrast to the findings from this study, in Thailand, higher educational attainment communities in rural Thailand experienced fewer negative effects from floods and droughts, potentially due to better access to government financial aid (Garbero, & Muttarak 2013). These causes caused a major disruption in the academic calendar, with 68.46% of students reporting frequent class cancellations. These delays unavoidably disturb the continuity and quality of education, potentially resulting in long-term academic deficits for the pupils involved.

5.2 Effect of Flooding on educational Infrastructure

Flooding had a mixed impact on school infrastructure. This study found that 55.2 percent of responders reporting no effect on school infrastructure even though school activities were interrupted. In contrast to finding, Chaudhary and Timsina (2018) noted that School buildings, especially those that are poorly constructed or located in vulnerable areas, suffer significant damage during floods, leading to fears of infrastructure collapse and further disrupting educational activities. Floodwaters exert hydrostatic pressure on school buildings, causing structural damage and functional disruption (Vatteri & D'Ayala, 2023). The difference in this finding might be due to the difference in the building material used and the intensity of the floods as well. Also, the duration of the flood could be a factor in safety of the school infrastructure

In addition, sizeable minority (41.91%) reported damage to educational materials including books and laptops. This devastation, combined with the destruction of school grounds, furniture, and instructional equipment, adds strain to an already difficult educational environment. This finding is similar to a study in Zimbabwe by Mudavanhu (2014) who noted 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. Due to a lack of sturdy infrastructure, schools are unable to recover fast after flood damage, worsening the disruption to children's education.

Furthermore, only 17.65% of respondents reported efforts to repair or rebuild school infrastructure, indicating a slow and inadequate response to flooding-related damage. This means that many schools may stay in disrepair long after the floods have subsided, impeding pupils' academic advancement. In addition, more than half (53.68%) of students reported changes in homework frequency, most likely as a result of flooding disruptions. This decline in homework frequency may have a negative impact on students' learning results, as

homework is an important component of reinforcing classroom information and developing independent learning skills.

5.3 Psychological Effect of Flooding On Pupil

More than half (61.03%) experienced trouble sleeping and intrusive thoughts about the flooding. 38.23% of responders reported panic attacks, while 24.27% had terrible dreams about the event. More serious consequences, such as increased use of alcohol or drugs, were uncommon (1.47%). Similarly, Nanud et. Al., (2023) reported that students affected by floods experience unstable emotions, academic strain, and desire recognition, while seeking support and using varied coping mechanisms. The psychological distress resulting from flooding can manifest in increased sleep disturbances, such as insomnia or fragmented sleep, further exacerbating academic performance and overall well-being.

Psychological discomfort also had an impact on academic performance, with 50% expressing difficulty concentrating. Despite these obstacles, the vast majority (88.97%) were able to pay attention in class, and 94.85% were eager to return to school. Interestingly, the flooding had no major impact on the children's future objectives, with 90.44% reporting no change in their plans. However, 41.18% were concerned that further flooding disasters might hinder them from accomplishing their goals.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The findings highlight the multifaceted impact of flooding on schoolchildren, ranging from socio-demographic challenges to significant disruptions in education, infrastructure, and psychological health. Despite the resilience of these children, the study emphasizes the need for targeted interventions to support educational continuity, infrastructure rehabilitation, and psychological health in the aftermath of such natural disasters.

6.2 RECOMMENDATIONS

Based on the findings discussed, the following recommendations are proposed to address the challenges faced by school children in flood-affected region. By implementing these recommendations, stakeholders can better support the educational and psychological well-being of children in flood-affected regions, helping them to overcome the challenges posed by such natural disasters and achieve their future aspirations.

The Ghana Education Service should provide Financial Assistance Programmes: these programs will provide targeted financial support for low-income families to meet children's educational requirements. This could include things like scholarships, school materials, and transportation expenses.

In addition, Parental Education Programs should be enrolled by the GES to improve parental support for children's education by developing and promoting educational programs, especially in regions with high rates of illiteracy.

Approved building permits should be obtained from NADMO and City Planning Agencies.

Ghana Education Service should provide emergency education strategies, including temporary learning places and virtual options, to ensure education continuity during and after flooding.

There should be a collaboration between GES and the communities affected by floods to Implement Community-based Education Programs during school closures to engage pupils in learning. These could include local community centres that offer educational activities or mobile learning units.

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APPENDIX I.

CHILD ASSENT FORM

CHILD ASSENT FORM

EFFECTS OF FLOODING ON EDUCATION IN CENTRAL TONGU AND ADA EAST DISTRICTS OF GHANA

Introduction

My name is KLEVO SHINE, a student of Ensign Global College in Kpong. I am researching the topic, "Effects of Flooding on Education in Central Tongu and Ada East Districts of Ghana ". I am asking you to participate in this research study since it will help me to know the impact of the flooding on education

General Information

If you agree to be in this study, you will be asked to answer some questions.

Possible Benefits

Your participation in this study will help us know the extent of damage to education in your district. A pen or pencil will be given to you after participation.

Possible Risks and Discomforts

There are no associated risks for you or your parents.

Voluntary Participation and Right to Leave the Research

You can stop participating at any time if you feel uncomfortable. No one will be angry with you if you do not want to participate.

Confidentiality

Your information will be kept confidential. No one will be able to know how you responded **to the questions, and your information will be anonymous.**

Contacts for Additional Information

You may ask me any questions about this study. You can call me at any time [0243606702] or talk to me the next time you see me. Please talk about this study with your parents before deciding whether to participate. I will also seek permission from your parents before you are enrolled on the study. Even if your parents say "yes", you can still decide not to participate.

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Ensign Global College, Kpong. If you have any questions about your rights as a research participant, you can contact the IRB Office of the school between the hours of 8:00 am-5:00 pm through the office mobile phone:0245762229 or the school's email address: registrar@ensign.edu.gh

CHILD'S NAME: …… RESEARCHER'S NAME……

Child's Mark/Thumbprint……. Researcher's Signature……

Date: …… **Date:** ……

APPENDIX II. CONSENT FORM

IMPACT OF FLOODING ON EDUCATION IN CENTRAL TONGU DISTRICT AND ADA EAST DISTRICTS OF GHANA

INTRODUCTION AND INFORMED CONSENT FORM TO PARTICIPANTS

Hello sir /madam,

My name is KLEVO SHINE, a student at Ensign Global College, Kpong**.** I am conducting a STUDY on the impact of flooding on education in Central Tongu District in the Volta Region and Ada East District in the Greater Accra Region of Ghana.

This is an academic work that could be used to formulate a policy, I would be very much grateful if you could spare some time to answer this interview guide. Flooding poses a significant threat to various aspects of human life, including infrastructure, health, and livelihoods. Education, as a fundamental component of societal development, is not immune to the disruptive impacts of floods. Flood events can cause widespread damage to educational facilities, disrupt learning environments, and impede access to schooling for affected populations (UNESCO,2020).

It is on this basis that the researcher seeks to identify and understand the impacts of flooding on education, pupils, educational workers and infrastructure that is to suggest diversified designs and implementation of different kinds of interventions required in order to increase the support, education and other interventions. The researcher also seeks to add to existing knowledge in the topic area.

Confidentiality

The information you're about to share will not be disclosed to anyone outside this research team. Your name will not be written, but a number will be assigned to your questionnaire. All information from this research will be kept private and under lock with a key.

Risks

This survey might require you to give very personal details about your experience with flooding. You might feel a bit awkward about some of the questions I will ask but bear in mind you don't have to answer every question if you don't want to. You should also bear in mind you don't have to explain if you refuse to partake in this survey and you don't have to explain why you don't want to answer any questions you're uncomfortable with.

The interview will require respondents to give information about their experiences and the impact of the flooding on the academic calendar, and infrastructure. These may cause some form of emotional trauma but pose no subsequent risk to the respondents.

Benefits

You will either be given either a pen or pencil depending on the class as motivation to partake in this survey. However, your participation will assist us in reaching our objectives for the study in order to make informed decisions regarding the impact of flooding on education in Central Tongu and Ada East Districts respectively.

Duration

Due to the detailed nature of the questions I'm about to ask you, this interview might take 25 to 35 minutes to complete. It will involve some questions about your live experience, the impact and effect the flooding posed on education in the respective

districts. It is not compulsory to partake in this survey and you're not obliged to answer any or all of the questions.

APPENDIX III

QUESTIONAIRE

Impact of Flooding on Education in Ghana - Questionnaire

Dear Participant, thank you for participating in this research study. Your insights are invaluable in understanding the impact of flooding on education in Central Tongu and Ada East Districts of Ghana. Please answer the following questions to the best of your ability. Your responses will remain confidential, and your identity will be anonymous.

Yes

No

Do you wish to participate in this study?

Deborah

Shine

Gladstone

Dzifa

Judith

Solomon

Akua

Confucius

Interviewer name

Participant ID

Volta

Greater Accra

Region

Central Tongu

District

Ada East

District

Bakpa Awadewoekome

Bakpa Zorotodzi

Kebenu

Community

Pediatorkope

Community

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

1/10Awadiwoekome RC

Pediatorkope school

Torgbe Aho Memorial school

Name of school

Yes

No

Were you in this school when the flooding occurred in October 2023?

Section 1: Demographic Information

Age (years)

Boy

Girl

Are you a Boy or a Girl?

Both Mother and Father

Mother

Father

Another family member

Alone

A sibling

Who do you live with at home?

How many people do you live with at home?

More money than you need?

Just enough money?

Less money than you need?

In general, would you say that your household has,

Yes

No

Is your father educated?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

2/10Primary

Secondary

Tertiary

don't know

JHS

What is your father's level of education?

Yes

No

Is your mother educated

Primary

Secondary

Tertiary

don't know

JHS

What is your mother's level of education?

Walking

Bicycle

Motorcycle

Canoe

What kind of transportation do you use to go to school?

Very far

Far

Near

Very near

Distance from your how to the school

Yes, at home

Yes, at school

No

Did you have breakfast today?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

3/10Rice with stew

Koko (porridge)

Tea / Beverage

Beans

Banku

Waakye

Other

What did you eat for breakfast?

Other (please specify)

Yes

No

Has there been enough food for you at home in the past month

Basic 4

Basic 5

Basic 6

JHS 1

JHS 2

JHS 3

Grade

How many people are there in your Class?

Section 2: Flooding Experience and Education Impact

Yes

No

Don't know

Has the flooding affected education in your community?

Yes

No

Was school in session during the flood?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

4/10Clean up after flooding

School not accessible by students and teachers

School used as shelter

None

Why was the school not in session?

Yes

No

Were your regular classes cancelled due to the flood?

1- 2 weeks

2 - 4 weeks

More than a month

How long after the flooding did you return to school?

Yes

No

Do you have friends who did not come back to school after the flooding?

How many female friends did not come back to school after the flooding?

How many male friends did not come back to school after the flooding?

Section 3: School Infrastructure and Academic Impact

Significantly damaged

Partially damaged

Not damaged at all

Not sure

In your opinion, how has flooding affected the infrastructure of your school?

Yes

No

Don't know

Have learning materials (e.g., books, computers) been damaged due to flooding?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

5/10School garden

Furniture

Computers

Other electronic assets

Student projects

Teaching materials

School building (walls)

None

Was any of these destroyed due to the flood?

Yes

No

Don't know

Have there been any efforts to rehabilitate or rebuild school infrastructure after flooding?

Garden

Furniture

Computers

Other electronic assets

Student projects

Teaching materials

School building (walls)

None

Which of these damages has been restored?

Yes

No

Was the frequency of homeworks affected due to the floods?

Everyday

One to three times a week

Less than once a week

Never

How often do you do homework for school?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

6/10No one

Sibling

Parent

Teacher

Other

Who usually helps you with your homework now?

Other (please specify)

None

Between 1-5 days

More than 5 days

In the last month, how many school days did you miss?

None

1

2

3

Other

How many class/subject teachers did you have for your class before the flood?

Other (please Specify)

None

1

2

3

other

How many class/subject teachers do you currently have?

0ther (please specify)

Yes

No

Is there a blackboard or whiteboard in your class?

7/10Yes, it was extended

Yes, it was cancelled

No, it had no effect

Don't Know

Was the school term affected due to the flooding?

Yes, it was cancelled

Yes, it was delayed

No, it had no effect

Don't know

Was the end of term exam affected during the period of flooding?

Section 4: Coping Mechanisms and Community Response

My teacher came to my house

Teacher provided virtual lessons

I had no contact with my teacher

My siblings provided lessons

No lessons

Relocated to a new school

Went to teacher’s house

During the closure of the school period, what was your learning approach

Very effective

Somewhat effective

Not very effective

Not effective at all

Not sure

In your view, how effective are these coping mechanisms in maintaining educational continuity during and after

flooding incidents?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

8/10**Psychological Health Effects**

Sleeping problems

Pictures in my head of what happened; feels like it's happening right now

Increased tension in relationship (eg. more arguing)

Anger or tantrums

Panic attacks

Bad dreams reminding me of what happened

Increased use of alcohol or drugs

Thought of suicide

Lack of energy

Staying away from anything that reminds me of what happened (people, places, things, situations, talks)

None

Psychological health effects experienced during or immediately after the flooding

Yes

No

Have these effects interfered with your school work?

Yes

No

Are you able to pay attention in class after the flood?

Yes

No

Do you worry that if there is another flooding incident your parent would be unable to take care of you?

Yes

No

Were you excited to come back to school after the flooding incident?

Yes

No

Were your parents willing to allow you come back to school after the flooding incident?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

9/10Doctor

Nurse

Teacher

Police

Pilot

Soldier

Rev. Minister

Don't know

Other

What was your future plans before the floods?

Other (please specify)

Yes

No

Have they changed?

If yes, why?

Yes

No

Do you fear that the incident of another flood will prevent you from achieving these plans?

6/11/24, 3:57 PM

Impact of Flooding on Education in Ghana - Questionnaire

https://kf.kobotoolbox.org/#/forms/aLBhW2CAAvtzXGk5jUXPqm/summary

APPENDIX IV.

OBSERVATION CHECKLIST

Observation Check list for School Facilities in Flood-Affected Areas

1. **School Buildings:**

- Are the school buildings situated in flood-prone areas?
- Check for signs of water damage on walls, floors, and ceilings.
- Assess the structural integrity of buildings post-flooding.

Classrooms:

- Inspect for water stains or mould growth.
- Check the condition of desks, chairs, and other furniture for damage.
- Evaluate the availability of adequate ventilation and lighting.

Sanitation Facilities:

- Assess the functionality of toilets and hand washing facilities.
- Check for signs of contamination or damage to sanitation infrastructure.
- Ensure accessibility for students, especially during flood events.

Water Supply:

- Evaluate the safety and cleanliness of drinking water sources.
- Check for contamination risks during flooding.
- Assess the reliability of water supply systems post-flooding.

5. **Electrical Systems:**

- Inspect electrical wiring and outlets for damage.
- Ensure that electrical systems are safe to use after flooding.
- Check for any electrical hazards that may affect student safety.

6. **Playgrounds and Outdoor Areas:**

- Assess the condition of playground equipment for damage.
- Check for debris or contamination on outdoor surfaces.
- Evaluate the safety of outdoor areas for students during and after flooding.

Library and Learning Resources:

- Inspect books, computers, and other learning materials for water damage.
- Evaluate the availability of alternative storage options to protect educational resources during flooding.
- Assess the functionality of library infrastructure post-flooding.

Emergency Preparedness:

- Check for the presence of emergency evacuation plans and procedures.
- Assess the availability of emergency supplies and equipment.
- Evaluate the school's readiness to respond to flooding events and ensure the safety of students and staff.

9. **Accessibility:**

- Ensure that facilities are accessible to all students, including those with disabilities, during and after flooding.
- Evaluate the adequacy of evacuation routes and accessibility features.

Community Support and Resilience:

- Assess the involvement of the local community in supporting schools during flooding events.
- Evaluate resilience measures implemented by the school and community to mitigate the effects of flooding on education.

APPENDIX V.

ETHICAL CLEARANCE LETTER

ENSIGN GLOBAL
COLLEGE

OUR REF: ENSIGN/IRB/EL/SN-267/01 April 29, 2024.
YOUR REF:

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Shine Klevo
Ensign Global College
Kpong.

Dear Shine,

ETHICAL CLEARANCE TO UNDERTAKE POSTGRADUATE RESEARCH

At the General Research Proposals Review Meeting of the *INSTITUTIONAL REVIEW BOARD (IRB)* of Ensign Global College held on Thursday, April 25, 2024, your research proposal entitled **"The Effects of Flooding on Education in Central Tonga District and Ada-East District of Ghana"** was considered.

You have been granted Ethical Clearance to collect data for the said research under academic supervision within the IRB's specified frameworks and guidelines.

We wish you all the best.

Sincerely,

Dr. (Mrs.) Rebecca Acquaah-Arhin
IRB Chairperson

ORIGINALITY REPORT

15%	12%	6%	10%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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16	Karyn E. Quansah, Chris Gordon, Fred Aboagye-Antwi, Rex Gerchie, Philip Louis Staddon. "The implication of climate variability on household water management; perception and practices among rural womenfolk in four communities in Ghana", Cogent Environmental Science, 2019 Publication	<1%