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Topic

Flood impacts on the lives of school children in Basse, (Upper River Region of The Gambia)

By

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DECLARATION OF AUTHORSHIP

I, Demba Baldeh declare that the Master's thesis entitled "Flood impacts on the lives of school children in Basse, Upper River Region of The Gambia" is my original work. I have written this dissertation independently. All sources I have used or quoted in the document have been acknowledged by means of complete referencing.

I am aware that, any violation of this regulation will lead to failure of the thesis.

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ABSTRACT

Globally, floods threaten the lives and livelihoods of hundreds of millions of people, including school going children. Flood related hazards increases the vulnerability of certain schools due to poor quality construction or maintenance work. With the advent of climate change and climate variability, these hazards are likely to exacerbate the vulnerability of school children especially in the Sahel zone of West Africa. The low lying topographic nature of Basse exposes the town to seasonal flooding along the river bank. This study, therefore investigates the impacts of flood on the lives of school children in Basse. The study specifically assesses flood damages on the live support systems of school children, identifies problems faced by school-going children during floods and finally evaluates measures adopted by the civil and school authorities and other organized groups to help school children overcome their problems during floods. The study targeted three groups, namely school children, head teachers, and parents. School children made up the primary target group for the study in terms of absolute numbers. They were purposely selected from seven schools where head teachers / principals were also integrated into the second target group. A total of 255 school children in grades 4 to 12 were randomly selected from a population of 718 school children in the seven (7) schools involved in this research. Proportional sampling was used to select the sample size of 255 (138 from Kaba Kama, 117 from Basse Layout) based on 95% confidence level and 5% margin of error. Four Focus Group Discussion (FGDs) consisting seven (7) parents in each were held and Key Informants Interviews (KII) was conducted with professionals, who deal with floods victims directly in the community. Chi square analysis and descriptive statistics from statistical packages for social sciences (SPSS) and Excel were mainly used in analyzing the data. The research established that none of the sampled schools was directly affected by floods, due to their location in a non-flood prone area. However,

some school children have been severely affected by floods either at home or on the roads, to and from schools. The residences of Kaba Kama, Basse-Layout and Kerewan Badala are mostly affected by floods. Findings revealed that practically, all the live support systems of school-going children living in Kaba kama, and Basse-Layout are moderately to severely affected by floods. The chi square test analysis confirmed only the food system and stationery loss show a significance variation between the two neighbourhoods. This will inadvertently cause low syllabus coverage and poor performance in examinations. Finally, both civil society groups and school authorities have taken measures in helping students to overcome the problems induced by floods. Unfortunately, most of their efforts are thwarted by political interferences, lack of resources and the prerequisite skills necessary to handle flood induced problems. The uncertainty of climate change phenomenon and lack of understanding of the hydrological activities complicated the issues further. Most flood-related morbidity and mortality are preventable through education, good floodplain management, and early warning systems. These make it a sine qua non to integrate climate change related hazards like riverine floods into the national school curriculum. The findings will further contribute to shape and reform public policies relevant to intellectual development, and societal resilience to adverse effects of climate change.

Key Words: school children, climate change, disaster-resilient, riverine flood, vulnerability.

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DEDICATION

To my compassionate mother and late foresighted father, who wish to see me exceling in school. I am here today in pursuance of that dream.

I also dedicate this work to the first Director of the WASCAL programme

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LIST OF ACRONYMS

CNO	Chief Nursing Officer
GBoS	Gambia Bureau of Statistics
GFAS	Gambia Fire and Ambulance Services
GRCS.	Gambia Red Cross Society
IPCC	Intergovernmental Panel on Climate Change
MDGs	Millennium Development Goals
MRC	Medical Research Council
NDMA	National Disaster Management Agency
NGOs	Non-Governmental Organisations
RDMA	Regional Disaster Management Agency
REO	Regional Education Office
SDGs	Sustainable Development Goals
SPSS.	Statistical Package for Social Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations International Children's Emergency Fund
URR	Upper River Region
UTG	University of The Gambia
WASCAL	West Africa Science Service Centre on Climate Change and Adapted Land use
WHO.	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1: Background to the Study

All over the world hundreds of millions of school going children are exposed to regular floods. In many cases, schools are neither constructed, nor maintained to be disaster-resilient. Floods when they occur, can cause medium to long-term negative (Pazzi *et al.,* 2016). Besides they can cause significant societal and economic damage and large number of fatalities worldwide.

Borrows and De Bruin (2006) cited in (Rahman, 2014) indicated that among natural catastrophes, flooding has claimed more lives than any other single natural hazard.

Ibrahim *et al*., (2017) cited Douglas (2008) state that "urban areas in Africa are exposed to four types of flooding: localized flooding due to inadequate drainage; flooding from small streams within the built-up area; flooding from major rivers; and coastal flooding". Due to the rapid growth of urban populations in Africa, flood impacts are likely to be aggravated. Douglas *et al*., (2008) further refer to Tarhule (2005) and Tschakert *et al*. (2010), who maintained that, within the discourse of Sahelian natural hazards, a diminished level of attention is given towards the increased risk of flooding in the region. The authors lament this lack of scientific research into the increased effects of flooding within the dry lands of the Sahel.

Whatever little empirical evidence there is indicates that floods have resulted in damages to school facilities, suspension of classes, destruction of learning materials, and poor and deteriorating learning environments in the Sahel zone. In schools that have escaped physical and material damage, school activities were still disrupted by their extended uses as shelters for

evacuees and by laborious clean-up efforts normally with the school children (Cadag *et al.*, 2017).

In the eastern part of The Gambia, commercial and residential areas of Basse Town (375 km away from the capital, Banjul), simply referred to as Basse, is frequently exposed to flooding as the River Gambia overflows its banks at this location, during years of high river flows (BORE, 2015). In September of 2015 in particular, flooding in Basse, reported as the worst in their living experience by many residents, halted road and ferry transport for two weeks.

Floods in Basse thus prove not only to be a major disrupter of economic activities but also of social, educational and cultural activities. Taking a cue from Khatoon, *et al.* (2013), each time a (flood) disaster occur, it is reasonable to assume that some children who take a prolonged break from school, never return to class.

1.2: Statement of the Problem

In order to satisfy information requirements of disaster relief agencies, limited crop and property damage assessment in post-flood situations, are occasionally carried out by those agencies. That said scientific research on the scope and socioeconomic impacts of floods in The Gambia is very sparse, even though floods recur quite frequently. With the exception of a case study in Ebo Town, located in a different geographic context 500 km to the West of Basse (Bore, 2015), flood impacts on children and adolescents of school-going age in particular is almost inexistent. How recurrent floods affect gross enrolment rate, school completion, gender parity in enrolment, and other social progress indicators is anybody's guess.

1.3: Main objectives

The main thrust of the research was to examine flood impacts on the lives of school children in Basse in order to shape and reform public policies relevant to their intellectual development, and societal resilience to adverse weather and climate impacts.

1.3.1: Specific objectives

Specifically, the research will:

1. Assess flood damages on the live support systems of school children.
2. Identify problems faced by school-going children during floods in the study area.
3. Evaluate measures taken by civil and school authorities and other organized groups to help school children overcome their problems during floods.

1.4: Research questions

1. To what extent has floods impaired the live support systems of school children?
2. How do these impacts translate to well-being, learning experience and attainment of school going children in Basse?
3. What are the general and specific problems faced by schools going children during and immediately after floods in the study area?
4. What measures, if any, have civic society, school authorities and other influential groups taken in the past to alleviate flood-induced problems? And, how successful have these measures been?

1.5: Conceptual and theoretical framework

The conceptual framework describes the different factors impacting on the lives of school children during floods. It posits that when floods occur, structural weaknesses amplify the severity of the flood hazard.

This study borrows from the 3-level *Existence-Relatedness-Growth* (ERG) needs model of Alderfer (1969), which better fits empirical data than Maslow's pioneering 5-level hierarchy model (Maslow, 1943; Wanous and Zwany, 1977). Instead of postulating a strict ERG hierarchy however, this study considers *Growth* to be dependent on both *Existence* and *Relatedness* factors. This study further postulates a bi-directional relationship between these two factors (see Figure 1.1b). In essence, fulfilment of school children's cognitive needs (i.e. Growth) strongly influenced by fulfilment of their basic physiological and safety needs (i.e. Existence) as well as their social and affiliation needs (Relatedness) (Mcleod, 2017). As alluded to under the research objectives, Figure 1.1b illustrates how externalities such as floods impact on ERG factors

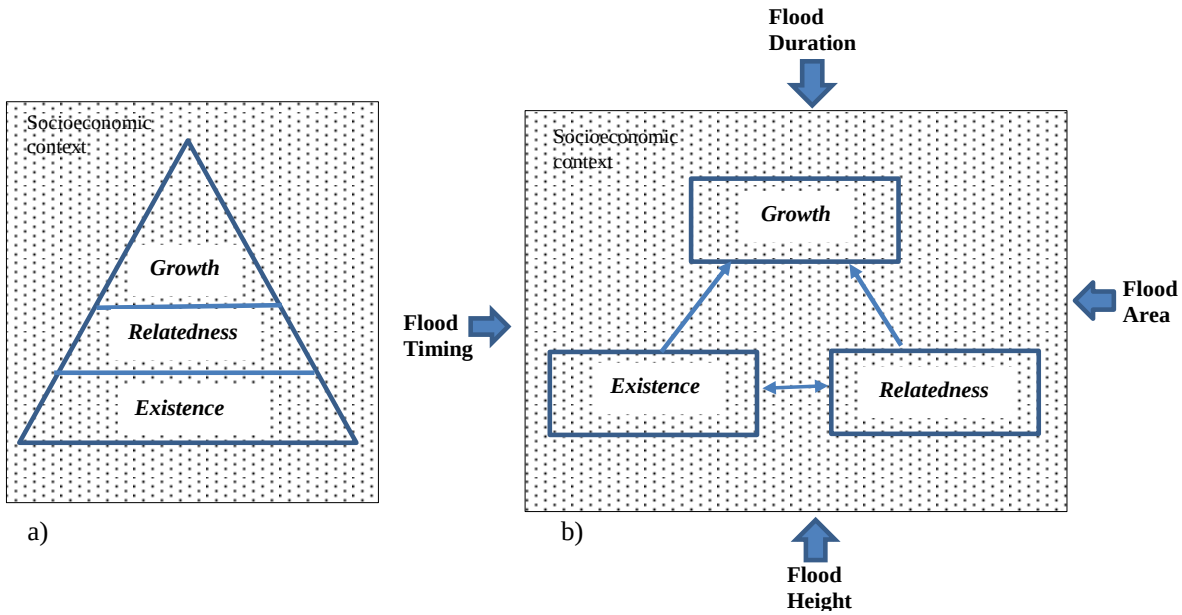


Figure 1.1: a) ERG hierarchy model (Alderfer, 1969), b) modified ERG model with key characteristics of flood externality (This study)

1.6: Purpose of the study

The overriding purpose of this study is to obtain policy-relevant insights on flood impacts on school children. These could be related to nutrition and basic healthcare, personal safety, learning experiences and educational attainment. The research is open to other impacts that might not be so obvious, and have not been previously documented. The information obtained will therefore help policy designers to incorporate strategies geared towards improving the resilience of educators and learners to floods, not only in the study area but also in other places exposed to riverine floods.

1.7: Limitation of the Study

Even though the study was carefully planned, limiting issues emerged during the study. Most notably, the non-occurrence of a flood during 2017 deprived the author the opportunity of conducting research under ideal conditions. The study also did not include children below 7 years attending early childhood development (ECD) established. Many researches confirm that younger children tend to be more vulnerable to hazards and diseases (Mason et al., 2010). However, their exclusion was influenced by time and resource constraints. Few parents who were contacted through telephone to be part of the FGDs were also unavailable and/or could not be reachable. Hence, their accounts in the research could not be presumed out.

Finally, the non-availability of satellite images of the areas inundated by floods stand out as an important limitation to this investigation.

CHAPTER TWO

LITERATURE REVIEW

2.1: Introduction

Literatures reviewed during this research are organized around five thematic areas as follows: (1) floods history and types; (2) strain/stress placed by floods on lives support systems of school children; (3) annual and learning cycle impacts of flooding; (4) general and specific problems faced by school children during and immediately after flooding; and (5) solutions to the flood problems and their effectiveness.

2.2: Floods history and types

According to Rachelle, (2013) as cited in (Braimah *et al.,* 2014), flooding can occur if the amount of precipitation in a catchment area exceeds the evaporation rate and infiltration capacity of the soil. Pareva, (1998) was quoted in the same study to have categorized flooding into slow-onset, rapid-onset and flash flooding. Slow-onset floods usually last for a relatively longer period such as one or more weeks, or even months. Anecdotal evidence suggests that floods in Basse (fall into the slow-onset type).

According to Docey *et al.*, Rosenberg (2008), Braimah *et al.* (2014) among others, Physical land features including soil type, vegetation cover, and other drainage basin characteristics influence flood outcomes. Floods occur on varying timelines, ranging from flash floods with little time to reach peak water levels, to floods that in which water levels rise over days or weeks. Flash floods, characterized by high-velocity flows and short warning times have the highest average mortality rates per event and are responsible for the majority of flood deaths in developed countries (Jonkman, 2005). In contrast, slow-onset floods being the focus of this study are

caused by gradual accumulation of heavy rainfall and are less likely to cause mortality because of sufficient time for warning and evacuation.

The most vulnerable landscapes for floods are low-lying parts of flood plains, low-lying coasts and deltas, and areas bordering small streams subject to flash floods. Rivers are attractive places for settlement, as they offer human populations transport links, a water source, energy source, recreational amenities, and fertile land for agriculture. But as a result of rivers' proximity to settlements floods become a major natural hazard (Mwape, 2009).

Across the globe, floods have posed tremendous danger to people's lives and properties. Askew, (1999) reports that floods cause about one third of all deaths, one third of all injuries and one third of all damage from natural disasters.

Kavegue & Eguavoen, (2016) pointed out that, floods like many other hazards are continuously impacting negatively in the attainment of basic education for school children, as envisaged in the millennium development goals (MDGs) and the 2030 Sustainable Development Goals (SDGs) targets in Africa

Floods in The Gambia have been reported far back to 1948 as confirmed by Jarju (2009). But these were not river related floods instead they were due to poor drainage system after heavy torrential rains. In recent years, that is, 1988, 1999, 2002, 2003, 2004, 2015 and 2016 riverine floods were observed in some parts of Central River Region (CRR) and Basse Areas (Jarju, 2009). Flash floods in urban areas, kombo in particular are all attributable to poor drainage. Flash floods occur in river basins where steep slopes, small size, high rainfall intensity combined generate fast flowing bodies of water and rapidly rising and receding water levels.

Since flood is one of the most prevalent natural hazards pronounced in Basse, one is obliged to investigate into the stress it placed on live support systems of the respondents.

2.3: Strain/stress placed by floods on lives support systems of school children

Floods are the leading cause of natural disaster deaths worldwide and were responsible for 6.8 million deaths in the 20th century. Asia is the most flood-affected region, accounting for nearly 50% of flood-related fatalities in the last quarter of the 20th century (Doocy *et al.*, 2013).

The occurrence of natural disasters has shown a negative trend as annual incidents of disaster events have increased in the Pakistan. Approximately more than 20 million people in Sindh province has affected due to floods of 2010. A study was carried out in the districts of Sindh province such as Sukkur, Skikarpur, Ghotki, Khairpur, Larkana, Qambar-Shahdadkot, Jacobabad, Kashmore-Kandhkot, Naushehroferoze, Shaheed Benazir Abad, Dadu, Jamshoro, Matiari, Badin and Thatta during the year of 2010. Schools in the district were hampered in their operation when the disaster occurred. During that horrifying flood many schools were unable to opened due to flooding, students were transferred to other schools while others dropout of the school system. Access to safe water, sanitation, quality of education and health awareness were desperately needed, along with micro-economic development to bring the population up to a liveable standard (Khatoon, *et al.,* 2013).

In a related development, Flood Damaged Schools Lead to Education Worries (2010) observed that floods caused serious damage to schools in Muzaffargarh District in the province of Pujab in Pakistan. During the floods, 1.6 million children were affected as schools were damaged or the same were used as shelters (Nduku, 2013).

Recurring cycle of floods in several parts of Kenya have impacted negatively on livelihood, loss of life, destruction of property and infrastructure as well as disruption of education in cases of schools being submerged, books destroyed, students displaced or schools used as shelter by the displaced. Toilets get submerged pausing health and hygiene dangers. Poor sanitation facilities are one of the reasons of lower participation rates of girls in education (Akello, 2014)

2.4: Annual and learning cycle impacts of flooding

The World Education Forum's Dakar Framework for Action: Education for All (EFA) (UNESCO, 2000) acknowledged that natural hazards pose significant challenges to countries in meeting their EFA goals, and would require international level support. Worldwide 875 million school children live in high seismic risk zones, with 32 million of these children newly enrolled in primary education (Wisner *et al.,* 2004). As this threat has continued to grow, neither national nor international commitments have kept pace with the huge numbers of children affected. Damaged schools disrupt hard won educational rights. When instruction time or contact hours is lost, ultimately quality of education drops. When there are no plans for alternative locations and students are denied continuous schooling, many will never be able to catch up and will drop out permanently (Khatoon, *et al.,* 2013)

Research indicated 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. Children noted a range of experiences, from food insecurity to being withdrawn from school and sometimes forced into early marriages (Mudavanhu, 2014). According to UNESCO (2007), floods regularly prevent millions of children from attending school.

Flooding occur for over 3 months per year in Mekong Delta Region, China and coincide with the beginning of academic years, suspending regular educational programs. Some schools have to open later than others but have to complete the same curriculum, requiring them to compromise the quality of teachings. Some students have to come a long way to school and floods hinder the transportation means when roads get damaged and endanger their lives. Some schools are constructed without proper flood resilient features, resulting in damaged facilities and life loss when collapsed (Save The Children Australia, 2009)

2.5: General and specific problems faced by school children during and immediately after floods

The results of a study conducted in Brahmaputra River, Assam, India show that the risk of sliding into poverty increases with recurrent floods and it is modulated by the demographic and household specific characteristics in addition to social and community specific characteristics. The number of days of homelessness also increases vulnerability (Mahanta & Das, 2017). Hence, school children will be exposed to all sorts of diseases due to sleeping outdoor where mosquitoes will easily access them. They may also be tempted to join other families who may introduce them to activities that may be detrimental to their health. The absence of a proper shelter for them can again result to insecurity both in their lives and property.

Floods are also closely associated with health risks such as drinking water-borne diseases for human being as well as livestock. By limiting mobility of children school enrolment is equally affected by floods (Cai, Tamiru, Magidi, & Mapedza, 2016). In some areas school has been suspended for several weeks, while in others schools remain open, however there is a lack of teaching staff and learning materials and attendance is low because students are trying to survive the floods with their families. Each time a disaster occurs, masses of children are excluded from

school, many never to return. Floods alone affect upwards of 500 million people per year (Khatoon *et al.*, 2013)

Across south-east Asia and Africa, access to schools is restricted by structural damage, standing water and unhygienic conditions (Pazzi *et al.*, 2016, Khatoon *et al.*, 2013 and others). In 2014, the worst-ever floods in the Valley of Kashmir has fully destroyed thousands of school buildings while thousands others have been partially damaged, rendering them unfit for schooling. According to official figures, out of 11,526 primary and middle school buildings, 1986 have collapsed while 2685 were partially damaged. Besides, 525 school buildings have been converted into shelters for flood affected people. The devastating floods left 17 schools submerged in central Kashmir's Ganderbal district of which one school building has been declared unsafe while two primary schools have been partially damaged. In South Kashmir's Pulwama district, 12 schools were left unsafe for schooling while 157 are partially damaged. 99 school buildings have been damaged in Kulgam district. 30 schools in Anantnag education zone and 11 in Bijbehara education zone have been declared unfit for schooling as well. This assessment is of the primary and middle schools only. As per the departmental survey, 2397 students enrolled in different primary and middle schools have been left without buildings (Pazzi *et al.*, 2016).

The historic floods of 2000 and 2001 in the Mekong Delta region resulted in an emergency situation in a large scale proportion. Thousands of schools were underwater. Children have been found to be the most vulnerable during the flood season. It has been observed from the past records that most death during floods was of children.

The effects of flood in Africa's most populous country (Nigeria) in the flooding years of 1987, 1991 and 1994 was classified as follows;

Cause, aggravate and precipitate diarrheal water-borne diseases, destroy farms, food and cash crops. Make the individual, communities and nation poor through disruption of services and the degradation of agriculture land Destroy human life, animal life and properties Damage and destroy buildings, bridges, dams, embankments, drains, roads, railways etc. Degrade the environment, spread infestations; soil and water are polluted by chemicals. Cause soil infertility through leaching and erosion of rich top soil cause fire outbreaks (Etuonovbe, 2011). As stated earlier children are more vulnerable to flood related diseases, thus they will be severely affected during these floods.

During the months of August and early September 2007, in Northern Ghana, where excessive rainfall coupled with the spillage of excess water upstream from the Bagre Reservoir in Burkina Faso resulted in extensive floods in many districts of the region. Apart from the death toll of 20, the floods caused severe damage including the loss of livestock, the destruction of farmlands, houses, bridges, schools and health facilities, as well as damage to the water supply, irrigation systems, food storage and processing facilities (Armah, *et al.,* 2010). It is apparent that school children will loss valuable time in attending lessons as some schools are damaged. The damaged of foodstuff and water supply facilities will hugely impact children feeding and welfare.

Furthermore, (Mwape, 2009) observed that the displacement of people and damage to infrastructure due to hazards, disrupts African societies in their development effects and impact on the achievement of almost every Millennium Development Goal, for example, damage to schools in Uganda left at least 100,000 children out of school.

2.6: Solutions to flood problems and their effectiveness

A study conducted by Mudavanhu (2014) suggested that a culture of safety be promoted through disaster education, development of good road networks and enforcement of building codes during construction of school infrastructure. The author's Findings also supported the need for adaptation strategies that address the risks specific to school children.

The agencies forming the children in a Changing Climate Coalition (CCC) recognized that the immediate and greater steps must be taken to reduce the risks to children from the horrifying disasters (Tanner *et al.,* 2009). More recently, several initiatives have worked to facilitate children's active participation and agency in efforts to prevent, prepare for, cope with and adapt to climate change and when extreme events will come through their rights-based approaches, children's participation in concerned policy spaces and child- centred risk communication (Munawar *et al.,* 2003). These approaches could beef-up children's ability to participate in DRR activities in their homes, schools and communities, whilst learning and aware about the disasters and climate change and extreme events. They also acknowledge children's role in communicating risks of disasters to their peers and relatives as well as providing practical and creative ideas to help their families and communities recover from extreme events and havoc disasters (Tanner *et al.,* 2009).

In the efforts to limit the rising death toll after flood 2002, Vietnam authorities at different levels have developed many strategies such as setting up temporary day-care centres (emergency kindergarten) for children whose famer parents must leave home to earn a living or a national program on universalization of swimming skills for children developed to ensure safety of children against flood drowning situations. A new initiative on integration of disaster risk reduction into school curriculum also was raised in the Vietnam National Strategy on Natural

Disaster Prevention, Response and Mitigation to 2020 with the focus on enhancing capacity for school teachers and children on disaster preparedness and response measures and further raising public awareness on disaster prevention in general community.

Save the Children is helping the education system recover in all three flood affected countries. The aid agency has set up temporary learning spaces so classes can resume immediately, distributed back to school kits with basic learning materials and is providing psychosocial support to students affected by the floods (Save The Children Australia, 2009).

Among the solutions to flood problems in Zimbabwe some positive response strategies do exist, often in the form of food aid from the government and non-governmental organisations such as Red Cross and Plan International, amongst others. Schools were also given free exercise and some textbooks from UNICEF Zimbabwe to ease the effects of disasters amongst children. To reduce the prevalence of malaria in the area, the region is fumigated on a yearly basis between September and December through the Ministry of Health and Child Care (Mudavanhu, 2014).

In contrast to what happened in Zimbabwe, the study found out that schools were not directly affected by floods; hence no such response strategies existed. But few school children benefitted from food aid through their parents in communities. Because those communities were directly affected by floods and they received assistance from Red Cross and other donors. Mosquito treated bed nets were also supplied to the two (2) communities in the study area during the course of the study period.

In a similar solution to floods problem, The Vatican Radio News, (2017) reported that, Save the Children is also distributing tarpaulins for temporary shelter, running special playgroups for children to help them recover from the South Asian floods. They are distributing relief items

including hygiene kits, kitchen kits and cash for basic necessities like food and clean drinking water.

According to School with Disaster Preparedness (2011), there are several things schools can do in preparedness. These include developing a disaster preparedness and emergency plan; conducting periodic drills; training teachers on how floods affect learning programmes and how to evacuate students; holding frequent workshops for teachers on preparedness and teaching students and teachers on first aid among others (Nduku, 2013).

Using an average annual budget of USD 1.08 million, Marikina created a flood-control project for 12 communities that included:

• Construction or rehabilitation of major outfalls.

• Improvements in the networks of canals, drainage systems, creeks and waterways. Improvements were done to sidewalks and the drainage network, as well as part of a 6-km road dike.

• Paving roads to reduce the amount of sand, pebbles and mud that enters the drainage system. In 1992, less than half of Marikina's 500 km of roads were paved. Under this activity, the city's engineering department brought the length of paved road up to 350 km by year 2000.

• Removal of informal settlements through the resettlement program, and the removal of commercial buildings, slaughterhouses and other industries from the riverside.

• Regular river dredging, which is a responsibility of the national government that the city government took on (Yu & Iglesias, 2008).

As of 2004, the flood controls for the five communities were successful, and the remaining that is closest to the river required attention.

In summary, many scientific publications expect an increase in the frequency and intensity of floods due to the effects of climate change (IPCC, 2007). Hence, it is evident that, population growth and migration of people to coastal areas and river banks, will exacerbate flood impacts on the lives of many including school children. In addition, the consequences of flood encompass multiple types of damage, such as environmental losses, economic damage and loss of life. All these anticipated damages will hugely handicap both learning experiences and educational attainments of school children.

From the literatures reviewed, it is significantly clear that floods have been and are still ravaging the lives of people globally. School children are among the most vulnerable to flood hazards, yet the attention given to floods impact on their lives is minimal, especially in Africa. In The Gambia, literature on floods impact on the lives of school children is virtually non-existence; hence there are little strategies in place to address these impacts. Therefore a huge gap exists that require urgent attention given the overwhelming pronouncement of climate change globally.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1: The Study Area

Basse is the study area of this research and it is located in the Fulladu East District that covers 2,070 Km^2 of the Gambia territory. Its central coordinates are: 13° 18' 35" N and longitudes 14° 12' 49" W. Basse is the administrative headquarters of the Upper River Region (URR) and is one of the eight Local Government Areas in the Gambia. The average mean temperature of the settlement is 24^oC, while the minimum and maximum averages are 18^oC and 36^oC respectively. The annual mean rainfall is approximately 876 millimetres (Jaiteh & Sarr, 2011)

The upriver settlement is 375 kilometres from the capital of Banjul. The town has a bustling village market, a ferry crossing to the north bank for passengers and goods, and it is an important transit point for merchandise going to eastern Senegal, Mali and Guinea. Basse has a population of 237,220 people (GBoS, 2013) made up mostly of people of Fulbeh, Serahule, and Mandinko ethnic extraction.

Specifically, Kaba kama and Basse layout are selected for the study because they are two riverine flood prone areas. However, there is no school located within these two neighbourhoods. Nonetheless, many students resident in these two areas attend schools in other parts of Basse.

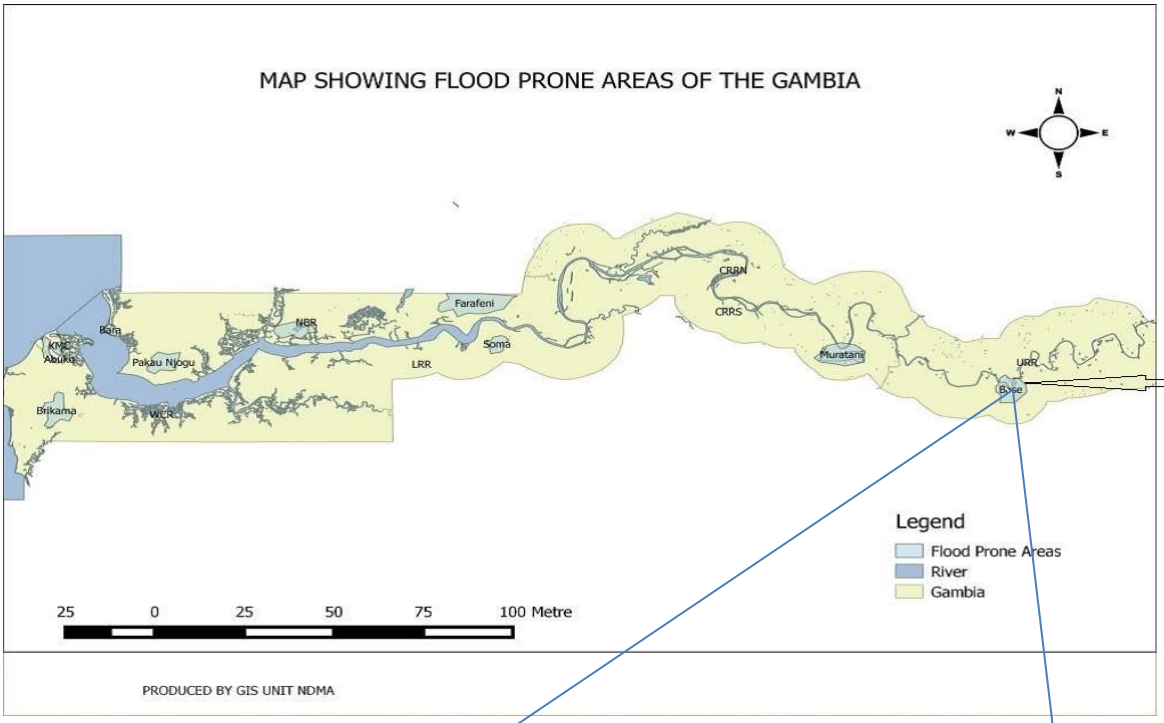


Figure 3.1a: Map of The Gambia showing location of Basse

Source: NDMC (2015)

Figure 3.1b: Map of Basse adapted from Google imagery (2018) CNES / Airbus

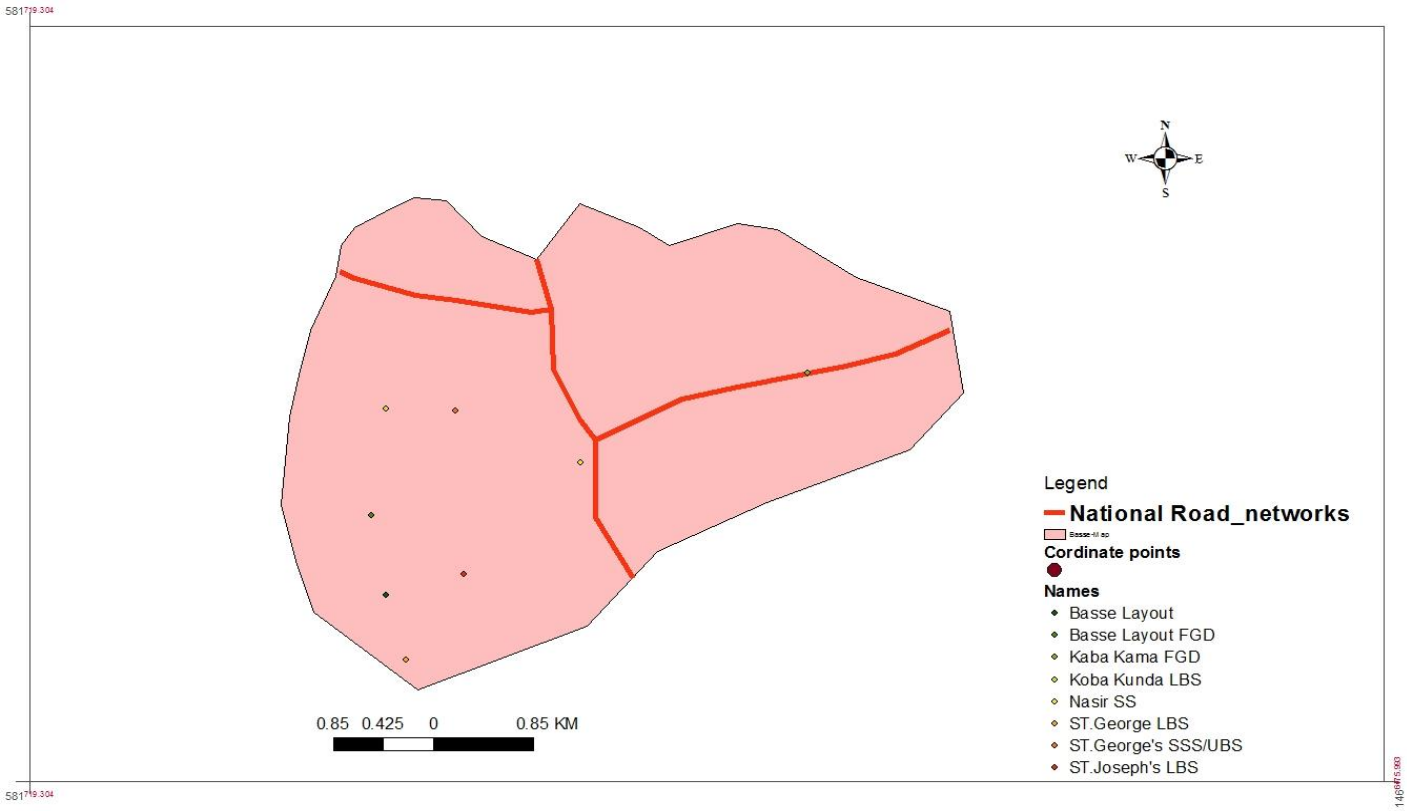


Figure 3.1c: Map of Basse showing the area under study

Source: Author 2018

3.1.1: Climate

Like most parts of the interior of The Gambia, Basse has a Sudan-type climate with two distinct seasons: a dry and wet season with annual rainfall between 600 and 1000 mm. The wet season normally begins in June and ends in early October. The dry season characterized by the dusty Harmattan winds commences immediately after the wet season**.** The average annual temperature of the area is 30^{o} centigrade. The average annual rainfall is 888 mm. August is the wettest month while May is the hottest and December the coldest in each year. Temperature in May the hottest month is 40.1^{o}C, while December the coldest has an average temperature of 16.6^{o}C (Weather statistics for Basse, 2016).

3.1.2: Topography

The land elevation of Basse town is 4 metres above sea level. The diversity in terrain within the town (hilly and low lying zones) provides diverse flood conditions in the various settlements where some areas are subjected to regular seasonal flooding. On the basis of topography, the entire Basse town is divided into three different regions: flood plains; terraces; and hilly areas. Most compounds in Kaba kama are within the flood plain area, while the other community under study have few pockets of hilly area. This explains why many respondents in this area stated that their homes were not directly hit by floods.

Regarding the two investigated neighbourhoods in this study, Kaba-Kama is located in the eastern part of the town, some 160 m upstream from the shoreline of the river during the dry season. Ground elevation varies from 8 metres around the main market in the North, to 18 metres in Mansajang area, in the South. For years Kaba-Kama has been one of the areas of Basse most affected by flood. The most flood-prone areas are located on the banks of a canal linking up with the river Gambia and the 'Farro' (that is flood plain zone used for rice cultivation). The top of the slope and the centre of the neighbourhood are alive with hilly lands and terraces.

Basse-Layout the second neighbourhood investigated is located in the north-western part of the town some 150 m from the River Gambia. The neighbourhood is built on hills, lateritic terraces often eroded by runoff during rainy season, and some floodplains areas. The area within 2 miles of Basse is covered by cropland (51%), shrubs (18%), grassland (17%), and trees (14%), within 10 miles by cropland (50%) and shrubs (23%), and within 50 miles by trees (43%) and cropland (28%).

Over the last one hundred and fifty years, The Gambia has experienced significant transformation of the natural land cover as a result of a number of anthropogenic and natural factors (Jaiteh, 2010). The land use Plan in The Gambia is divided into different land use types such as urban, residential, mixed use, semi-urban residential, institutional, villages, hotel, business and commercial, industrial, military, parks and recreation, cemetery, transportation and communication, dumping site, agriculture, shrub, forest, water and swamp, quarry, beaches and special areas. Basse virtually fulfilled all these categories of land use.

3.2: Recent floods history in Basse

In the most recent years, (from 2010 to 2017) a total of 5 seasonal floods had occurred in Basse. These were in 2010, 2012, 2013, 2015 and 2016. The first among these in 2010 was reported to have had severe effects on the lives of residents, especially in Kaba kama. According to NDMA (2015) report, a total of twelve (12) communities in the Upper River Region were affected. Two-thousand, one-hundred and ninety-one people were affected among who 92 children under 5 years of age, 4 people diagnosed with fever and 6 cases of diarrhoea were recorded. Eight (8) people were confirmed death due to flood related accident. Twenty five households with 208 members were displaced. Furthermore, 47 houses were totally damaged and 67 more were partially damaged.

The damage to food system was huge from the affected communities. Seventy percent (70%) of the affected members lost their foodstuff. Kaba kama residents lost 77 hectares of their rice fields which were submerged by the flood. Twenty-seven (27) small ruminants and 67 poultry were washed away.

Similarly, in 2012 there were 92 households affected by flood in which 1171 persons suffered from diverse problems caused by the floods. At a lower scale in 2013 a total of 21 households were affected by flood, most of whom were residents of Kaba kama. One child was reported dead after finding him under a bed in an inundated room in Kaba kama. In addition to these floods, the 2015 flood lasted longer than all recent floods (60 days). It had seriously affected business and the ferry service in the study area. In an interview with a reporter of the Daily observer (2015), the Governor in the area said 1 person has been confirmed death in the flood. Another problem caused by the flood is inability of patients to cross the river from the north bank to seek medical care from the health centre in Basse. Furthermore, he said the flood has cause severe damage to crops and shops.

Finally so far, in 2016 another flood hit Basse lasting for 40 days (MRC, 2017). It caused sleepless nights to many residents and halted many economic activities around the main market. Many shops were flooded and tailors who were busy sewing clothes for the approaching 'Tobaski' (Muslim's feast) had to evacuate. It was also reported to have caused the death of 4 cows that were found lying around the ferry terminal with a dozen others in critical condition (Daily Observer, 2015). A number of landlords who spoke to the Daily Observer reporter said their goats, sheep ducks and hens were washed away by the flood water. The NDMA officer explained to the reporter that anytime flood hits Basse, Madina Kaba kama is always affected.

The data below is significant in the study to analyse the trend of seasonal flooding in relation to the total annual rainfall. According to the Mann-Kendall trend test; there is no trend in the series which imply rainfall intensity in the study area is not responsible for flooding. However, the data show that most flood years occur when there is a rise in annual rainfall. This is clear in 1999 when rainfall was highest at 1376 mm. Other severe seasonal floods were reported in 2003,

2010, 2015 and 2016. All seven (7) out of 9 floods happened during an increased in the annual rainfall. Hence one can infer that, riverine floods in Basse are highly associated with an upsurge in the annual rainfall, even though the Mann-Kendall trend test indicated otherwise. As the computed p-value is greater than the significance level α (0.05), one cannot reject the null hypothesis (H0)**.**

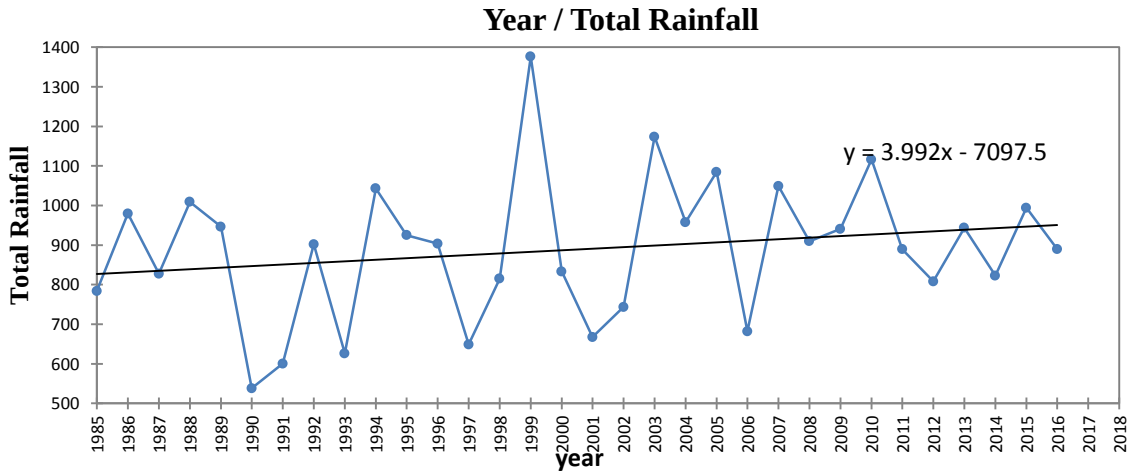


Figure 3.2: Shows a Mann-Kendall trend test of rainfall in Basse for a period of 32 years (from 1985 to 2016).

Source: Department of Water Resources 2017, modified by author of this study.

3.3: Research design

The research which is an explorative study relied heavily on field data which was conducted using standard data and information gathering techniques. Throughout the research, primary and secondary data collection techniques were used as appropriate. The research was organized around five integrated methodological components as follows: literature review; statistical sampling; stakeholder analysis and engagement; ground-truthing and mapping; and finally synthesis and integration.

In essence, the study is based on mixed methods (qualitative and quantitative), as it seeks to comprehend the impacts flood have on the life support systems of respondents, the problems they face during floods and what measures were taken to address them. Furthermore, a phenomenological design was used in the study since the intention was to comprehend interviewees' personal accounts of their floods experiences (Leedy and Ormrod, 2001). Above all, school children from two flood prone areas were given the opportunity to enumerate their ordeals in a most professional manner. A cross sectional procedure where information was collected from a set of cases at a point in time without any follow up was used in the study (Alexander et al., n.d.)

3.4: Data types and sources

Both primary and secondary data was gathered during the research. Analyses of flood-prone areas based on map, photographic and video analyses, was complemented by guided transect walks, physical measurements and oral corroboration as required. The information collected was indispensable to delineating a credible sampling area and production of maps. The researcher had engaged key informants, identified on the basis of their functions/occupation and knowledge of historic floods in Basse through face-to-face interviews to capitalize on oral information relevant to specific aspects of the proposed research[1]. Discussions with selected members of organized groups arranged before-hand was also used to collect flood, impact and community-action information.

Primary data was obtained from Focus Group Discussions (FGDs) among parents. FGDs were guided by a semi-structured guide containing a set of questions intended for parents. Schools

[1] As part of an initial stakeholder analysis, the Regional Education Office (REO). Regional Disaster Management Agency (RDMA) and Gambia Red Cross Society (GRCS) stand out as three key informants.

heads were key respondents to the questionnaires designed to collect primary data. These data had complemented the information obtained from the sampled respondents (school children) through questionnaires administration.

The research proponent has given particular attention to global literature on the subject to provide perspective to this research. Archived and on-line copies of relevant local disaster management strategies and relief reports published by front-line organizations, newspaper articles, and journals published by reputable institutions were also consulted. As they have valuable information in terms of contextualizing the broader research question on the physical and socioeconomic impacts of floods.

3.5: Tools for data collection

A variety of data collection tools were used in the study. These include hardware such as iPhone 4; itel1017 tablet; Global Positioning System (GPS) device; measuring tape; structured and interview protocols; and questionnaires. The iPhone was used to take photos of relevant information while the itel1017 tablet recorded the conversations during focus group discussions of FGDs. GPS coordinates of the schools and residence of the two community heads were taken for incorporation on a showing the geographic spread of respondents vis-à-vis river Gambia and the flood plan. The tape measure was used to establish a quantitative measure of distance and height of water level during floods.

Interview protocols and questionnaires are designed to solicit information on the four research questions specified in section 1.4 (see **appendix 1** for sample questionnaires).

3.6: Sample size and sampling procedure

Three target groups were involved in the study and these are: (1) school children, (2) head teachers, and (3) parents. School children made up the primary target group for the study in terms of absolute numbers. They were purposely selected from seven schools where head teachers / principals were also integrated into the second target group (Strydom, Fouche and Delport, 2005). Parents were selected using average household size to determine number of parents to students in the research. Three (3) Regional education officers (REOs) were also interviewed on specific aspects of the research. Four focused group discussions bringing together seven parents in each group.

A total of 255 school children in grades 4 to 12 were randomly selected from a population of 718 school children in the seven (7) schools involved in this research. Proportional sampling was used to select the number of school children from each school and per class. The sample size of 255 based on 95% confidence level and 5% margin of error is divided into 138 respondents from Kaba kama and 117 from Basse layout). Prior to the sampling size determination, the author visited all 11 schools in Basse to collect information on the number of school children coming from Kaba kama and Basse layout. Seven of those schools with the highest concentration of school children from these neighborhoods were selected for inclusion in the study. Refer to **table1** for a general breakdown of the sample size.

Table 3.1: Sampled population breakdown from the two neighborhoods as they appear per school.

School name	Population		Sample		Total Sample
	Kaba kama	Basse-Layout	Kaba kama	Basse-Layout	
Nasir Ahmaddiya SSS	61	81	23	28	51
St. George's SSS	32	17	12	6	18
Nasir Ahmaddiya UBS	33	81	12	28	40
St. Georges UBS	91	52	32	18	50
St. Joseph's LBS	76	1	27	1	28
St. George's LBS	84	42	30	15	45
Koba kunda LBS	5	62	2	21	23
Total	**382**	**336**	**138**	**117**	**255**

Source: this study, 2017 **(Note**: SSS is representing senior secondary school, UBS represents upper basic school and LBS refer to lower basic school. Also the abbreviated St. means saint**)**

Four FGDs of 7 parents each were held in the two communities to collect information on research themes. Three (3) groups of parents were from Kaba kama and one from Basse layout. The group representing the latter is all males. The first two groups of the former are all females and the remaining consists of 2 females and 5 males. Key Informants Interviews (KII) was conducted with other stakeholders from RDMA, GRCS, Medical Research Council (Basse Operation Manager), and the Health Centre's Chief Nursing Officer (CNO). These are professionals who deal with floods victims directly in the community. They also have enormous experience in dealing with flood victims for many times in the study area.

Table 3.2: Breakdown of focus group discussion members

Focus Group Discussion	Community	Number		Total
		Female	Male	
1	Kaba kama	7	0	7
2	Kaba kama	7	0	7
3	Kaba kama	2	5	7
4	Basse layout	0	7	7
Total in all	**2 communities**	**16**	**12**	**28**

Source: this study

3.7: Methods of data collection

After obtaining the necessary authorizations from the University of The Gambia and school authorities, questionnaires as presented in **Appendix 1** were administered by highly trained and multi-lingual enumerators and the author. Children were interviewed individually and their responses recorded. When needed, enumerators and author provided clarifications in children's own mother's language to improve effectiveness of interviews. During those interviews, those understood to have been directly affected by floods at home were re-directed to the author who asked for and recorded particulars of their parents. These parents were contacted later to be included in the FGDs which were held at the residence of the community's head (commonly called Alkalo). Twenty-eight (28) parents in all confirmed their availability and took part in the FGDs.

With regards to FGDs, the interviews took 2 hours on average, and were tape-recorded with the permission of interviewees. These recordings were used as back-up materials to notes taken during FGDs. The researcher solely conducted civilian and school officials' interviews which typically lasted one hour per interview. All interviews were face-to-face and conducted at the interviewee's work place. The heads/principals' questionnaires were given to them during the first day interviews with school children. They were later collected after telephone calls to confirm their availability.

It is significant to note the data collection was conducted from September 9th to November 2nd 2016, a period during which the annual flood typically occurs. However, there was no flood to be observed this year.

3.8: Data Analysis Procedure

Primarily four analytical tools were used in the data analysis. These are descriptive statistics, reliability test (Cronbach α-test), Mann Kendall test and Chi square analysis. Quantitative data from the students' questionnaire and field survey were subjected to descriptive statistical analysis, wherein tables and graphs were used and frequencies were determined. This simpler summary of the data make it easier to comprehend, gauge and make inferences (Neuman, 2006).

Inferential statistics such as Chi-Square was used to analyze the significance of difference observed between statistics derived from responses from the two communities. Cross tabulations were used in order to compare the relationships among variables. Strategies adopted by various civil societies and organized groups to help flood victims overcome their problems were also analyzed. Generally the analyses were mainly done by using Social Package for Social Science (SPSS) version 20. Microsoft Excel was used to prepare most graphical illustrations of raw and synthesized data. Qualitative data were analyzed and also presented, based on the pre-determined themes, categories and patterns, into which data from the field were compounded.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1: Socio-demographic profile of respondents

4.1.1: Reliability test

In order to accept the data collected for analysis and subsequent discussion, a reliability test was conducted. Cronbach's α-test (Bruin, 2006) for 37 questions in the survey questionnaire yielded a value of 0.775 indicating an acceptable degree of consistency between the questions using Likert scales. The individual items' statistics can be found at **appendix 4**.

4.1.2: Socio-demographic characteristics of respondents

Table 4.1: Socio-demographic characteristics of school children

Variable	Frequency	Percentage (%)
Age of Respondents		
Below 13	69	27.1
From 13 to 15	77	30.2
Above 15	109	42.7
Sex of Respondents		
Male	127	49.8
Female	128	50.2
Residence of Respondents		
Kaba kama	138	54.1
Basse-Layout	117	45.9
Parent's occupation		
Agricultural Workers	31	13.0
Services, Shop & Market sales workers	108	45.4
Professionals	46	19.3
Technicians and Associate Professionals	46	19.3
Elementary occupations	1	0.4
Clerical support staff	6	2.5

Source: this study

Notes: Elementary occupation here means those who are home-makers. It is significant to note from this research that, many women who use to be regarded as only home-makers are

concurrently engaged in other economic activities like personal services and retail/wholesale work.

The socio-demographic characteristics of school children interviewed are grouped into four themes as presented in **table 4.1**. The first theme represent their ages in line with the education policy. Thus, the majority of the school children (42%), above 15 years are currently attending senior secondary school falling, which is represented by. Children attending upper basic and lower basic schools are represented by 30.2% and 27.1% respectively.

The second theme is their gender classification. From this perspective, the respondents are almost evenly distributed. Out of 255 sample size, 50.2% were female respondents with males making up the remaining 49.8%.

As per the sampling procedure described in section 3.6, one-hundred and thirty-eight (138) respondents (54.1%) and one-hundred and seventeen (117) that is 49.9% were drawn from Kaba kama and Basse Layout respectively.

Table 4.1 also shows the occupation of parents whose children took part in this study. A majority of these (45.4%) described their parents as Services, Shops and Market sales workers. Almost 20% of children reported their parents as Professionals Associate professionals and Technicians. Agricultural workers, who belong to one of the most vulnerable socioeconomic groups in the study area ranked 13% of parents of children in the study. Clerical support staff and those in Elementary occupation are represented by 2.5% and 0.4% respectively.

4.2: Strain placed by floods on school children's life support systems.

4.2.1: Stress on the food systems (production, transportation and exchange)

4.2.1.1: Household access to basic food supplies

Data presented in **Figure 4.1** confirmed food supplies is disrupted by floods in the study area. Out of the total sampled respondents, 75% said that floods do affect their basic food supplies. On the other hand, 14.3% disagreed to this pronouncement while the remaining 10.7 % chose to remain neutral. Since food supply is exposed to floods, its damage will surely exacerbate the respondent's vulnerability by compromising their household food security. Both the female FGDs in Kaba kama explained that for the past five years, women have abandoned cultivating rice in their rice fields close to Madina Kaba kama. This is due to floods continuously submerging their crops when they are about to reach maturity mostly in September. This is in agreement with Mwape (2009) whose research also revealed that within the households whose crops and food stocks were damaged by the floods, 93% resided in the flood prone areas of the Sikaunzwe community in Zambia. This volatile situation left many victims without access to food, which exacerbated their vulnerability and impoverish them.

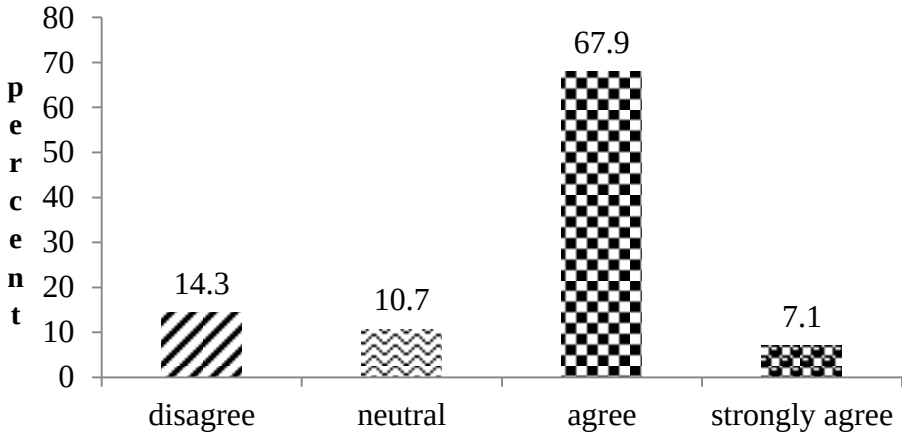


Figure 4.1: Household access to basic food supplies is disrupted

4.2.1.2: Household food rations reduced

From the 4 FGDs, respondents sated that when food becomes scarce household heads resort to reducing their food rations or the number of meals they take per day. This is a coping strategy that makes the family continue eating at least each other day. From the study, the data shows that 89.2% of school children interviewed said that floods normally cause a loss of their foodstuff. Many household heads usually reduce food rations at home and it makes them not eating enough. Parents participating in all four FGDs held in the study area acknowledged that many household heads hit by floods usually ration available food supplies. This is further corroborated by the Regional disaster management officer in a separate interview.

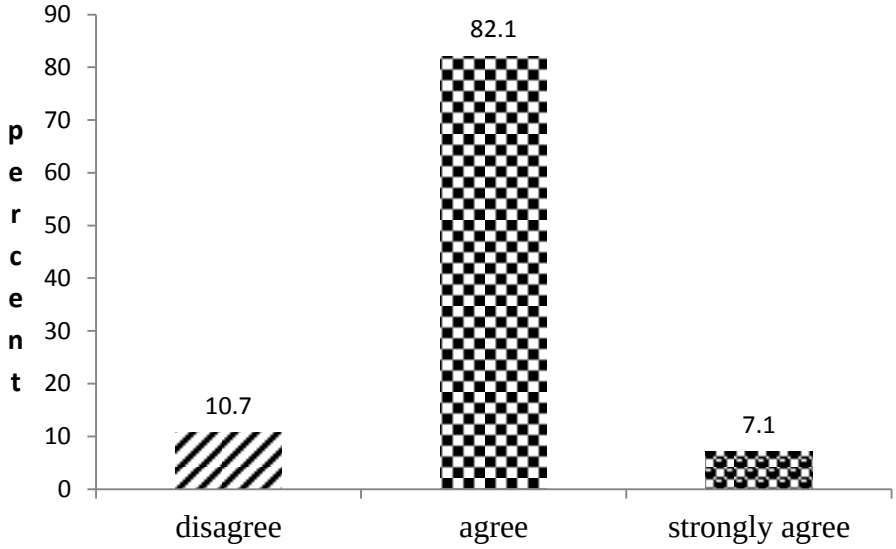


Figure 4.2: Household food rationing

4.2.1.3: Loss of Livestock

Livestock is the second largest food supply in the study area after Agricultural crop production. It is composed of cattle, sheep goats, donkeys, horses, pigs and poultry such as chicken and

ducks. Majority of respondents (60.7%) agreed that livestock is lost during floods. Some of the cows, sheep, goats and poultry were washed away while owners look on helplessly. Many cows suffer from disease related to floods and subsequently die. This information is represented in **figure 4.3**. From a separate interview with one key informant, it was confirmed that many cows were found dead around the ferry terminal during a recent flood which corroborate with the information found on the recent flood history in Basse (3.2)

Livestock losses by families can result in hardship for many families. Indeed most livestock can be source of food, some including donkeys, horses, and oxen are used in farm work and transportation. Donkeys, horses and oxen are used for ploughing of the farms, sowing of crops and weeding of unwanted grasses. They are again equipped with a cart to carry goods. Any crippling loss of livestock can thus lead to severe consequences. Mahanta & Das, (2017) reiterate this point by pointing out that farmers consider their livestock as their 'life bank'.

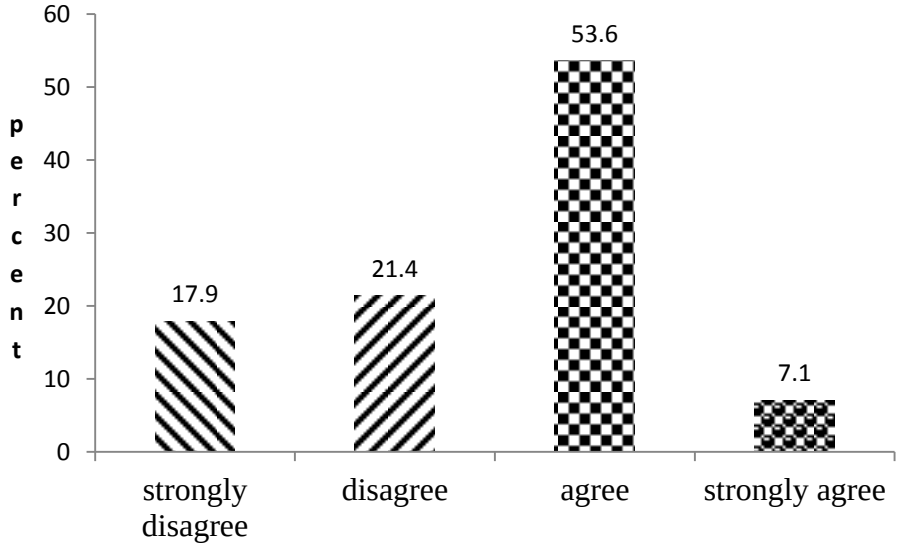


Figure 4.3: Livestock loss during floods

4.2.1.4: Damage of food in storage

About seven out of ten respondents 71.4% stated that foods in stores are damaged and rendered unfit for human consumption, by the riverine floods that regularly affect these communities. Respondents explained that flood waters usually penetrate their stores, kitchens and other places where food items are stored. On the other hand, 25% did not suffer from damage to food in storage. This was also confirmed by Ayieko (2006), who revealed that because of food shortages after disasters, children normally help the family to get food, missing school in the process and eventually not performing well as a result of inconsistency in learning. Interviews revealed that the rate of absenteeism is high in families where there are food shortages and most of the children from these families do not perform well (Nakanishi & Black, 2016).

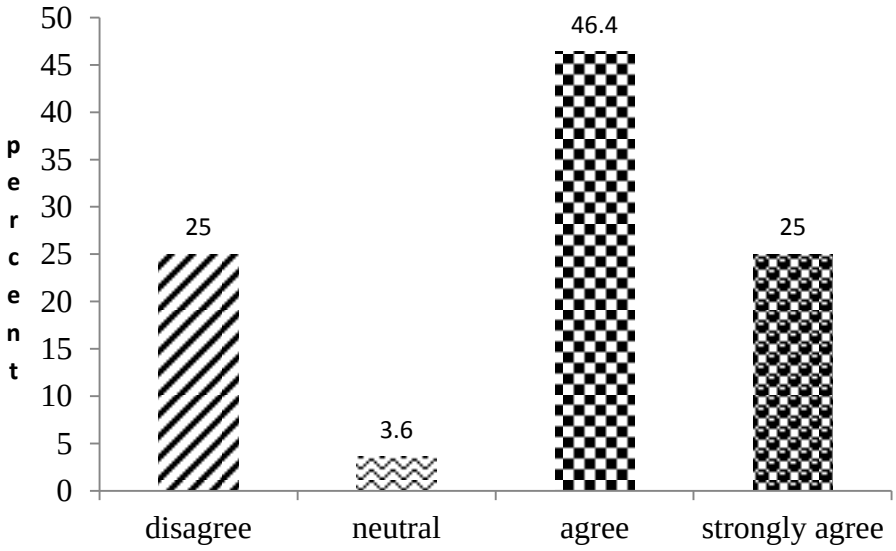


Figure 4.4: Damaged of foods in storage

4.2.1.5: Home gardens are destroyed

Concerning home gardens, 96.4% of respondents reported that from home gardens which supply households with vegetables that are essential for growth and health are destroyed. Women who participated in the FGDs explained that their vegetable gardens are submerged by floods just as their rice fields. Female parents who participated in the FGDs unanimously agreed that their produce from these gardens are largely used in maintaining their children in school. It is proceeds from these vegetables that they use to buy learning materials, school uniforms, pay school and study fees, and many other demands from their children to keep them in school. Dewan, (2015) has reported similar incidents of flooding of vegetable and crops which are cucumber and bitter gourd grown in floodplain in Bangladesh and Nepal.

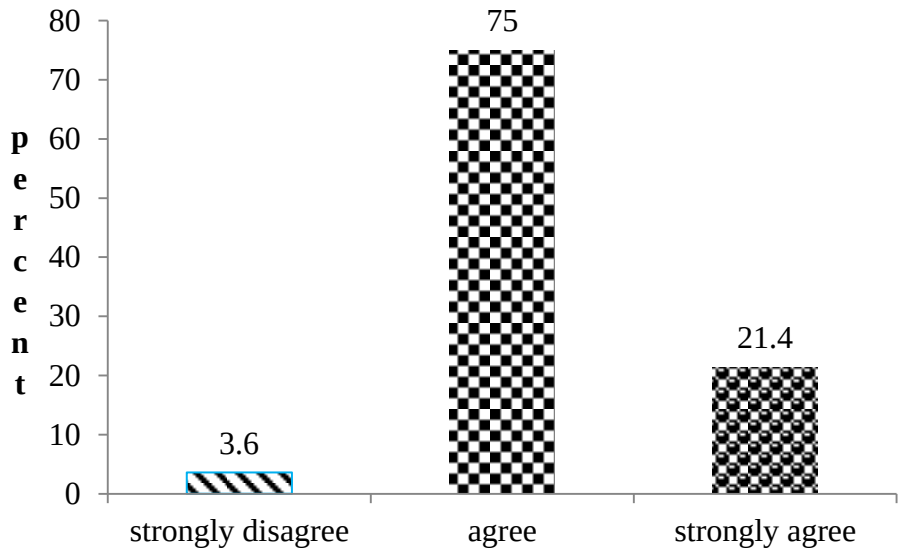


Figure 4.5: Home gardens destroyed

4.2.1.6: Increase in prices of basic commodities.

Half of the respondents concur that floods play a role in price increases of basic commodities. Thirty-five percent (35%) of respondents are not sure, and 14.3% disagree with the notion of floods play a part in price increases. It is often the case that when hazards like floods cause large-scale damage and losses of crops and livestock in agrarian societies, basic commodities like food crops such as rice, millet and beans as well vegetables becomes scarce translating into a rise in prices of basic commodity. These will make it more difficult for poor parents to be able to provide the most basic needs for their school children, thus making them more vulnerable to hazards like floods. From Maslow's hierarchy of needs theory, if ones physiological needs are not fulfilled, it will be impossible to satisfy any other need and difficult for the individual to learn in school.

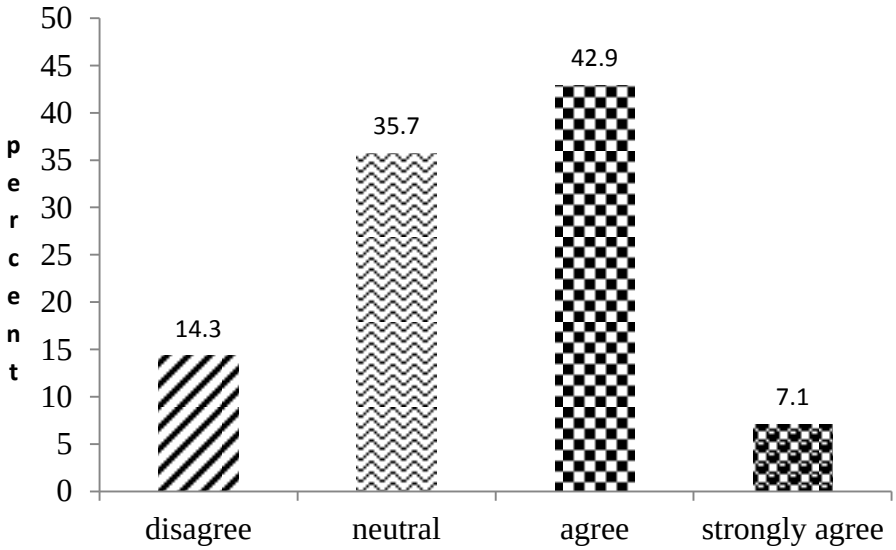


Figure 4.6: Increase in prices of basic commodities

4.2.1.7: Crop harvest losses

Nine out of ten respondents (92.9%) indicated that crop harvest losses are anticipated anytime floods hit. Less than five percent (5%) indicated there is no anticipated crop harvest lost. More than 13% of respondents are farmers who use their farm produce to feed school children and sell part of it to buy school uniforms and learning materials for them too. If these crops are loss due to floods, it will severely affect school children because they will become hungry and lack necessary materials for effective learning to take place. This finding is in line with Ajayi, (2012) who observed that loss of human life, damage to property, destruction of crops, loss of livestock and deterioration of health conditions owing to waterborne diseases, roads and bridges may get damaged and disrupted through flood disaster (see **figure 4.7** below).

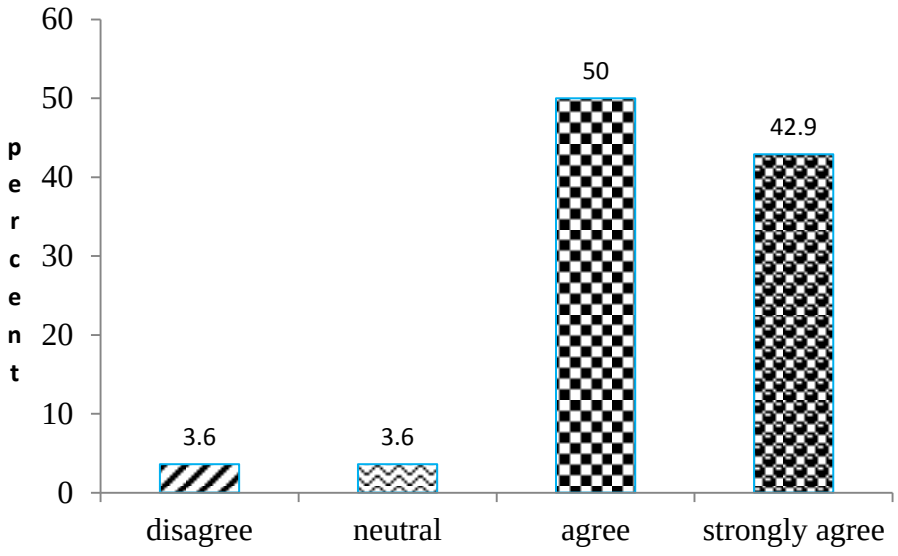


Figure 4.7: Crop harvest losses anticipated

4.2.2: Stress on water supply

4.2.2.1: Normal source of portable water

From the data collected**,** 78.5% of the respondents agreed that normal source of potable water is compromised or in accessible during floods. Households get their water from a variety of sources some get water from home taps, others from public taps, and others from open wells in their compounds. Households that fall within the last category are most affected because floodwaters sometimes find its way into their wells contaminating well water. Some interviewees observed changes in the colour and taste of running water from taps during floods. This, they attribute to a combination of leakages of buried pipes and contamination by flood waters. Therefore, one can comfortably conclude that portable water is seriously affected by floods in the study area. This makes life difficult as it will affect both sanitary facilities and economic activities as most respondents engage in petty trading that include sale of cooled drinking water. These findings are similar to those of Rahman (2014), (Hanslı, 2012), Mallin *et al.* (2009), and Smith and Perdek (2004), who found urban floodwaters to be a leading cause of contamination to water sources, especially if they carry faecal bacteria.

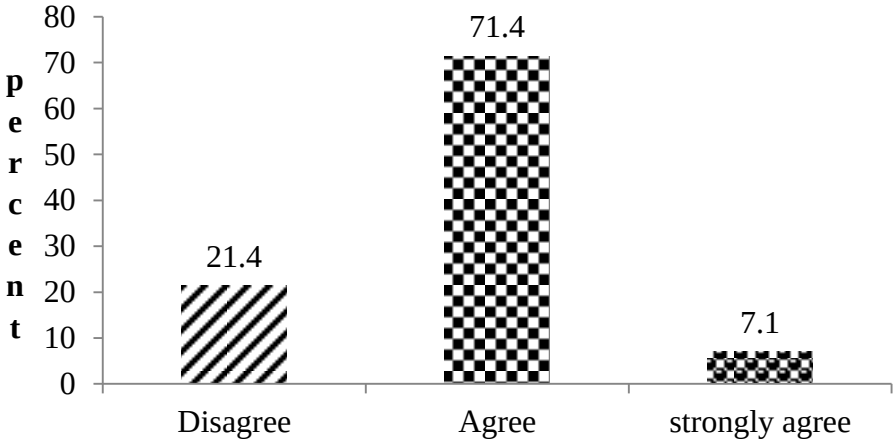


Figure 4.8: Normal source of potable water compromised or inaccessible

4.2.2.2: Alternative source of water

Concerning the alternative sources of water such as flood and rain water, there is wide agreement among the respondents that these sources are less desirable. Eighty-six percent (85.7%) of them stated that the alternative water available is not what they want. Nonetheless, 7.1% of respondents did not feel this water as an issue. The alternative source according to most respondents is water from floods, which is contaminated with numerous impurities. Respondents claim this water is only fit human consumption after treatment such as boiling which is time consuming and expensive because of fuelwood/charcoal relatively high cost.

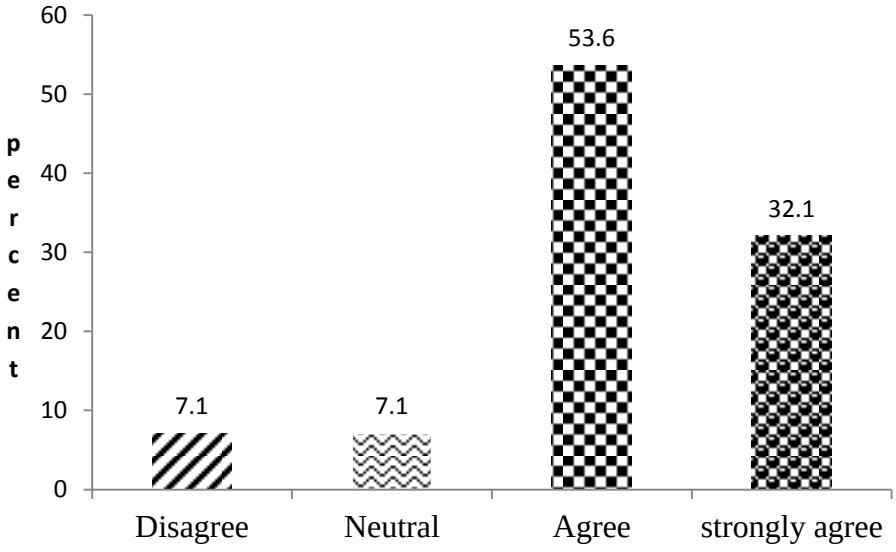


Figure 4.9: Alternative source water less desirable

4.2.2.3: Sanitary facility

Exactly 89.3% of the sampled size have complained of their sanitary facilities being inaccessible or damaged by floods. The remaining interviewees (10.7%) were unaffected (refer to **figure 4.10**). About four percent of respondents claimed their pit latrine toilet has been damaged 3 times

by floods in the last 10 years. Approximately 90% of the respondents agreed that alternative sanitary facilities are less hygienic (see **appendix 3**). During and immediate aftermath of floods adults use neighbours toilets when these are not damaged. Children on the other hand, use the open outdoors where it is dry enough, around compounds.

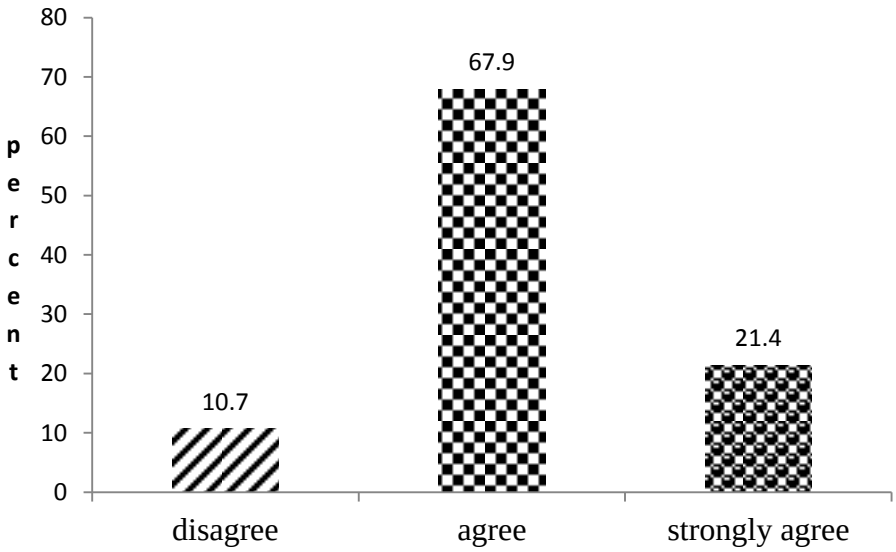
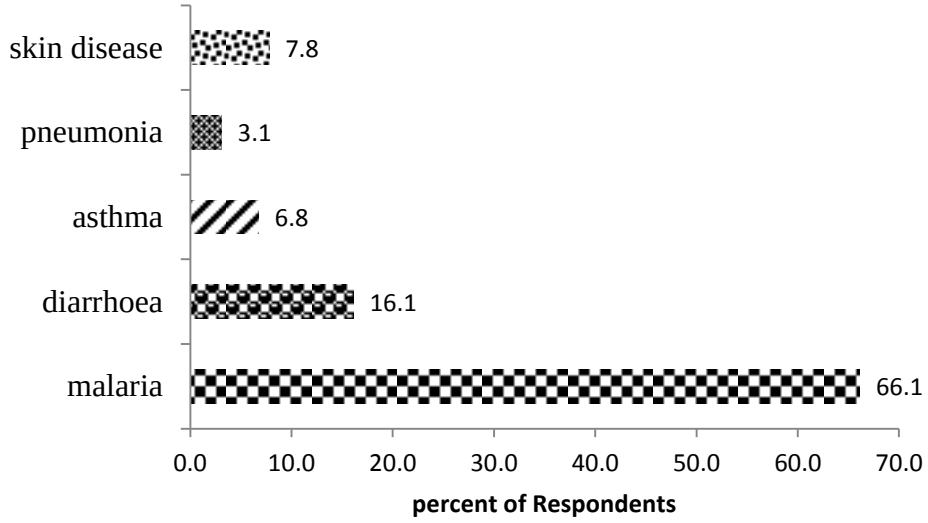


Figure 4.10: Normal sanitary facility compromised or inaccessible

4.2.3: Floods impact on healthcare delivery systems

The research revealed that the main health centre in the study area is not directly affected by floods, but it becomes difficult to access by patients from Kaba kama and Basse layout. Patients and sick from Basse layout find it more difficult to access the health facility due to damaged roads. Some Kaba kama residence too find the health centre inaccessible at the peak of the floods. Taxi drivers do not risk their cars in evacuating patients to the health centre. This was aptly captured by one FGD participant who said "it makes no difference whether it is an emergency or one offers the taxi driver a good price".

Eighty-two percent of respondents in the study stated that, floods related diseases are prevalent during and immediately (2 weeks) after floods. Respondents specifically pointed out malaria (66.1%), skin disease (7.8%), diarrheal (16.1%), pneumonia (3.1%) and asthma (6.8%) as the main diseases associated with floods (see **figure 4.11)**. Other diseases such as common cold, flu and fever are common but these are not correlated to floods. This concurs with the study



published by Du (2010) as well as UNICEF, (2009) which both find and report that malaria and cholera are a health menace in flood zones, and are aggravated by low socio-economic status.

Figure 4.11: Floods related diseases prevalent during and immediately after floods

During floods 71.4% respondents say that the sick and injured are not evacuated in timeous manner to a health facility, while 17.9% report the opposite. The remaining 11% had no clear position on the question. The implications for not evacuating affected people promptly to a health facility worsen the injury sustained or illness suffered. Hence the patient could be exposed to other complications and make the treatment process more costly.

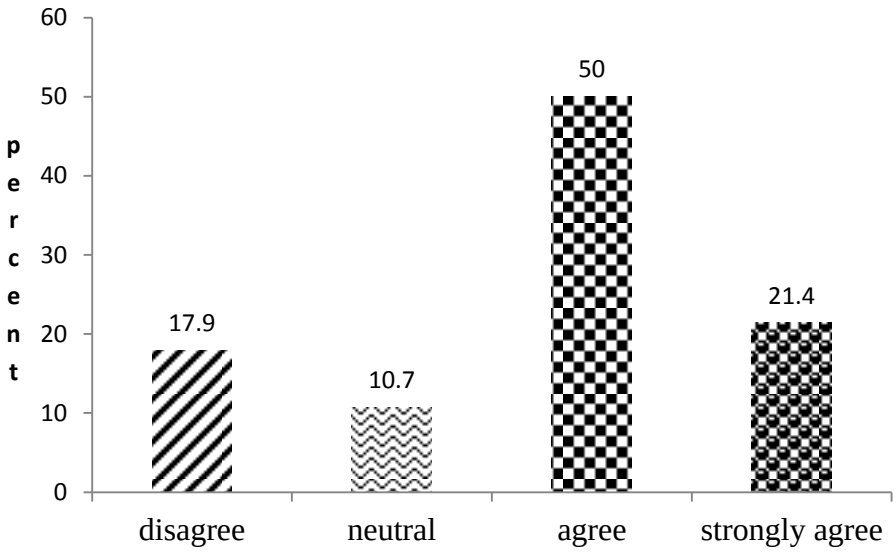


Figure 4.12: Injured and sick not evacuated in timeous manner

4.2.4: Floods impact on housing and the physical environment

4.2.4.1: Residential housing and detached building structures

A large majority (71.4%) of respondents reported experiencing some damage to residential housing, kitchens and stores. The remainder did not go through such a hard experience. This aspect of the study is in agreement with the one conducted by Braimah *et al.*, (2014) in Northern Ghana. Both discovered that floods caused major damages to residential houses. The implication is that there will be overcrowding in the few houses unaffected, even if flood victims are accommodated in neighbours' houses, as reported by majority of respondents.

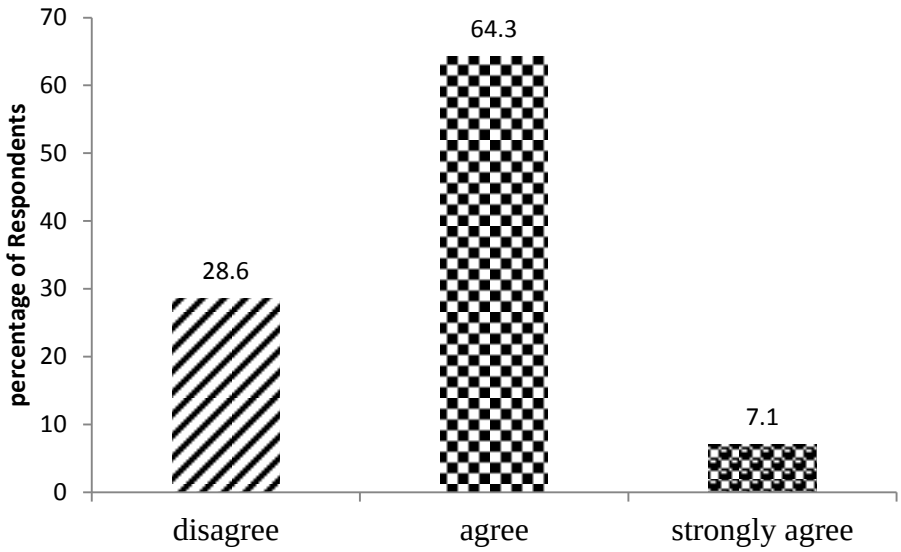


Figure 4.13: Residential housing and detached building structures suffer major damages

4.2.4.2: Damp conditions and algal growth after flood

Half (50%) of respondents stated that dampness of walls in buildings does not persist up to a month after the recession of floods. The study found 75% of respondents confirming their walls of unpainted buildings were covered with algal growth. These after drying up can cause lot of discomfort to the household members as it is easily carried by wind and inhaled by members. These can severely affect school children's health. When it dries up and is blown by wind, it can ignite those who are asthmatic thus leading to attacks. Other people around who are allergic to respiratory diseases will be severely affected by these fine particles airborne by windy conditions.

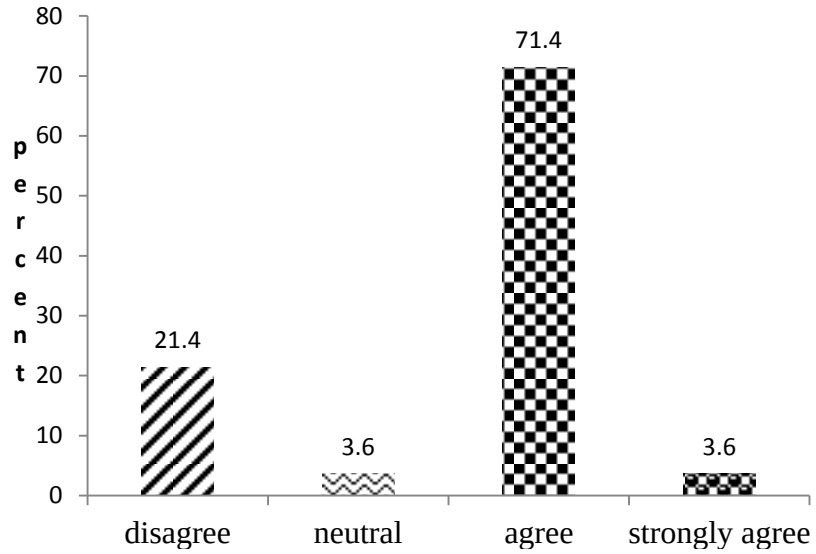


Figure 4.14: Walls of buildings covered with algal growth and dampness after flood recession

4.2.4.4: Flood damage to roads

Adults and children interviewed confirmed roads being severely damaged by the riverine floods in Kaba kama and Basse layout (**figure 4.15**). Virtually all minor roads within these two neighbourhoods except the main high-way are affected. This is concurrent with the studies conducted by both Bash (2015) and Braimah (2014). The destruction of roads will make them impassable hence disrupting economic activities and social outings. Some parents during the focus group discussion explained that the fire and rescue service personnel cannot respond to certain calls due to the bad roads. Floods have eroded some of them into deep gullies especially in Basse layout.

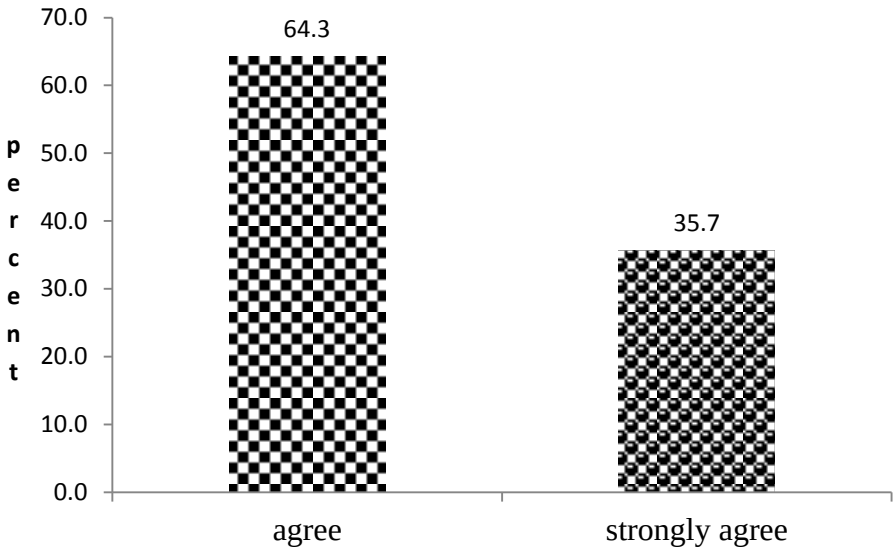


Figure 4.15: Roads to school affected by floods

4.2.5: Civilian protection system

On the issue of protection, school children needs security in order to be able to maximise their potentials in a safe and secured environment. As stated earlier, this is in fulfilment of Maslow's safety need which is a prerequisite for effective learning. Any threat to their environment will severely deter their concentration in learning which will compromise educational attainment.

4.2.5.1: Timely response of police to call outs

There is a divergent view from respondents on the issue of police response to call-outs. Half (50%) of respondents found police response time is acceptable (**figure 4.16**). Exactly 46.4% of respondents found the response time of police unacceptable and 3.6% remained neutrals on the matter.

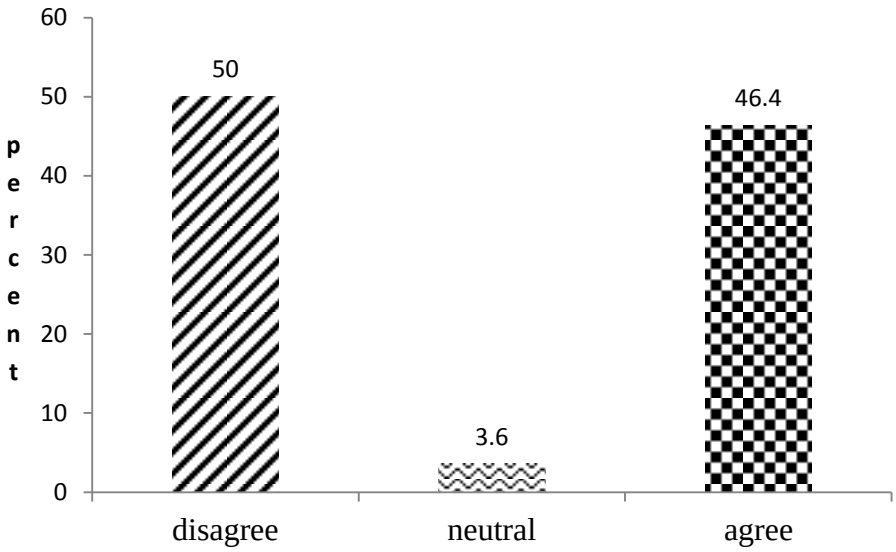


Figure 4.16: Timely response of Police to callouts

4.2.5.2: Fire service emergency response

Almost fifty-seven percent (57.2%) of respondents claimed that, the Gambia Fire and Ambulance Services (GFAS) response time with respect to emergencies was unacceptably long. More than a third (35.7%) commended the GFAS, whilst 7.1% were neutral on the matter. A delay in rescue operation will undoubtedly leave so many lives at stake and exacerbate vulnerability to natural hazards like floods. The FGD in Basse-layout pointed out the poor roads condition as responsible for the fire service delay in responding to calls. There are some places within the community that fire service vehicles cannot pass through.

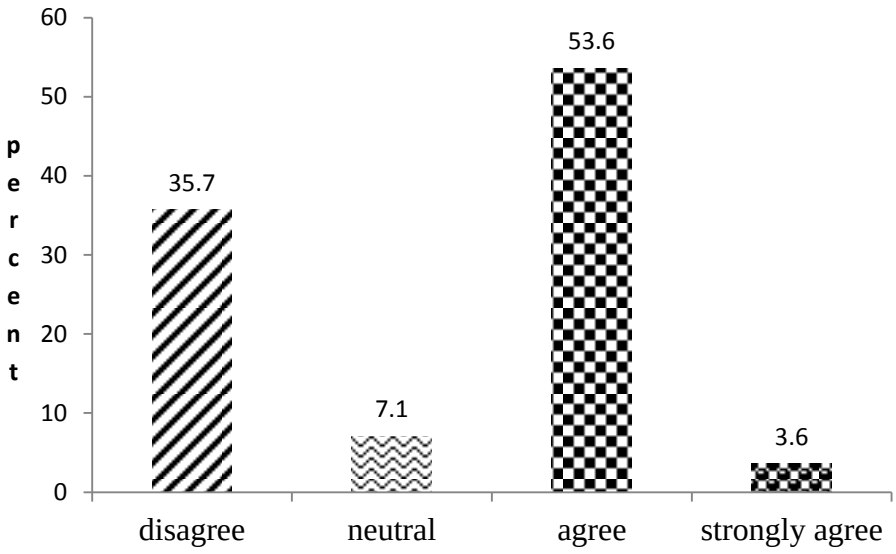


Figure 4.17: Timely response of Gambia Fire and Ambulance Services

4.2.5.3: Children Safety

With regards to school children safety, there is 100% agreement from the sampled population (**figure 4.18**). They all acknowledged having big concern for the safety of children during floods. There are instances reported elsewhere that children are carried away by floods. Some are found dead while others are injured and/or bitten by stranded animals like snakes and crocodiles. As reported by a key informant (the Red Cross officer) in Basse, some 3 school children were rescued at the outskirts of the study area during the 2016 floods. This finding is in concurrent with Du (2010) who observed drowning often occurs as a result of floods.in this case, individuals underestimating the depth of the water during floods and attempted to salvage materials and domestic animals, are drowned themselves.

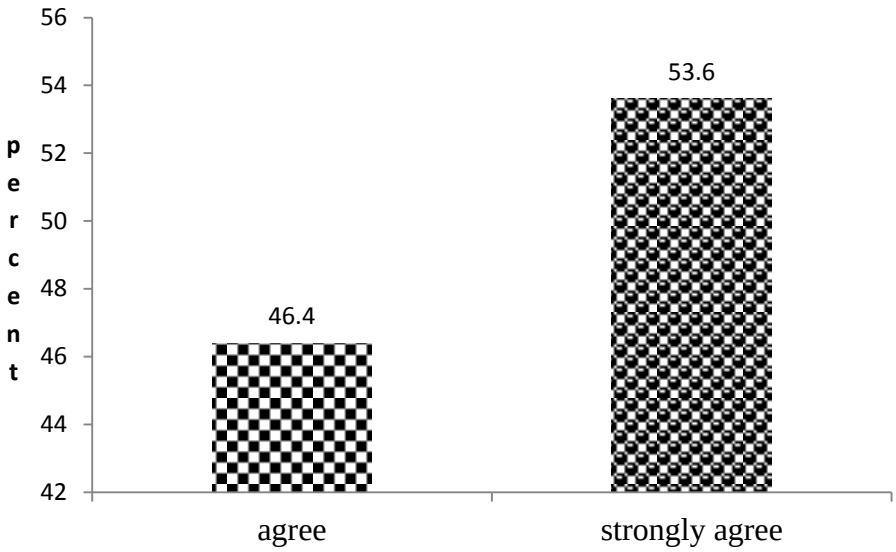


Figure 4.18: Concerns on children safety

4.2.5.4: Criminality pronouncement

The figure below show 71.4% of respondents reported that criminal activities are more proactive during floods. In contrary 10% of respondents believed that criminals are not in any way influenced by floods. According to 17% of participants in this study, they cannot tell whether criminal activities are more pronounced during floods than non-flood periods (see **figure 4.19** below). As clearly put by a FGD member, while flood victims are busy rescuing their belongings, petty criminals join in the action on pretext of helping, and seize the opportunity to steal valuables belonging to floods victims.

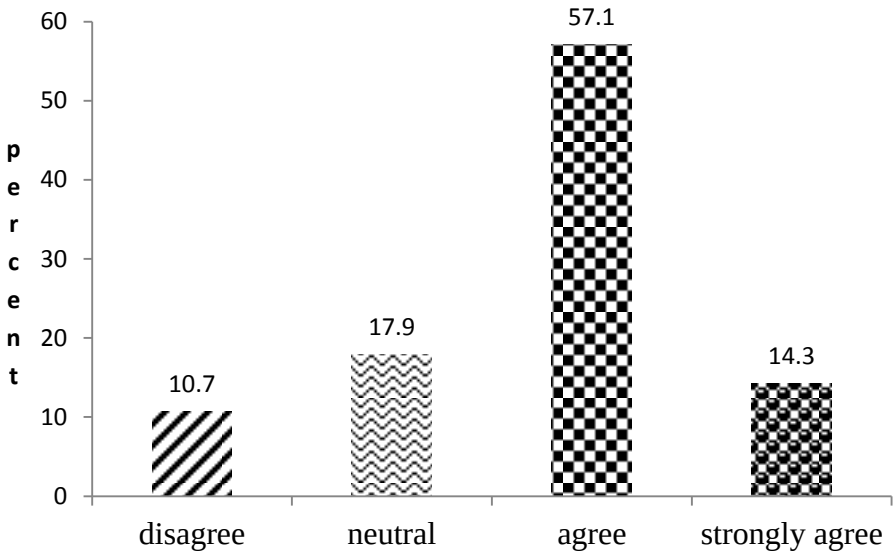


Figure 4.19: Criminality pronounced during flood periods

4.2.5.5: Disaster management

Disaster management is crucial both in terms of lost to be accrued during and recovery opportunities after any hazard. Hence, the availability of resources and good team leadership can lessen the severity of disasters. The majority (71.4%) of participants in the study believe that disaster management with respect to flooding is inadequate. In contrast, 17.9% believed the opposite to be true, while the rest 10.7% could not make an outright judgement on the matter (**figure 4.20**). Leadership and resource issues were mentioned as stumbling blocks by the key informants. One of the key informants disclosed that politics plays a part in poor distribution of aids to flood victims. The officer also averred that committees set up to distribute aids lack the organisational skills and experience to do so. Similar sentiments were expressed during FGDs in Kaba kama and Basse layout. The implication of it is those who are affected may not receive the aid thus exacerbating their vulnerability to floods.

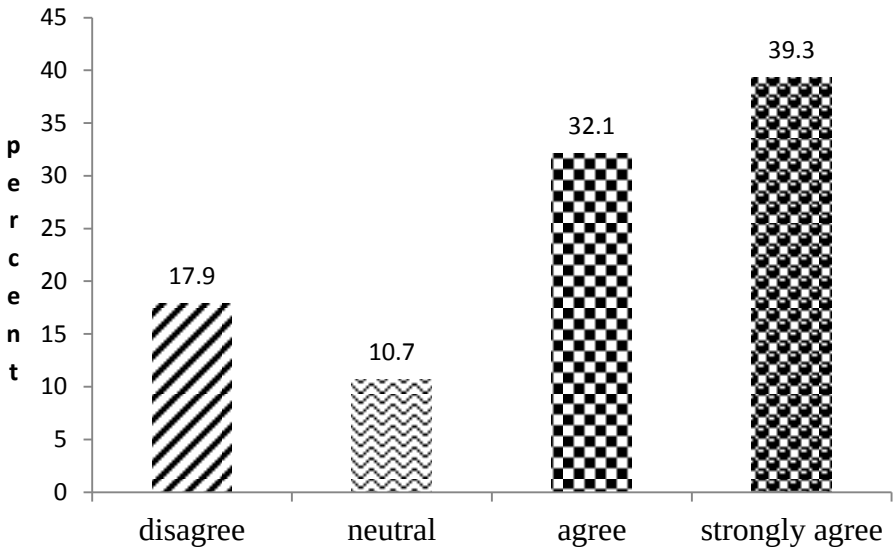


Figure 4.20: Disaster Management to flooding inadequate

4.2.6: Floods impact on transport and transit system

4.2.6.1: Public Transport

Three-quarters (75%) of respondents stated that only a small fleet of vehicles remained in circulation during floods. This observation was challenged by the remaining respondents (25%) (See **figure 4.21**). This is supported by the study conducted by Rahman (2014). The implication of small fleet of cars during floods is huge anywhere. There will be a fall in transaction of economic activities, and delay in receiving important social services like health. Feeding will also be severely disrupted given that most of the sampled population rely on services, shops and market sale to earn a living.

Plate 4.1: Show small fleet of vehicles in circulation during floods in Basse

Source: MRC archives 2017

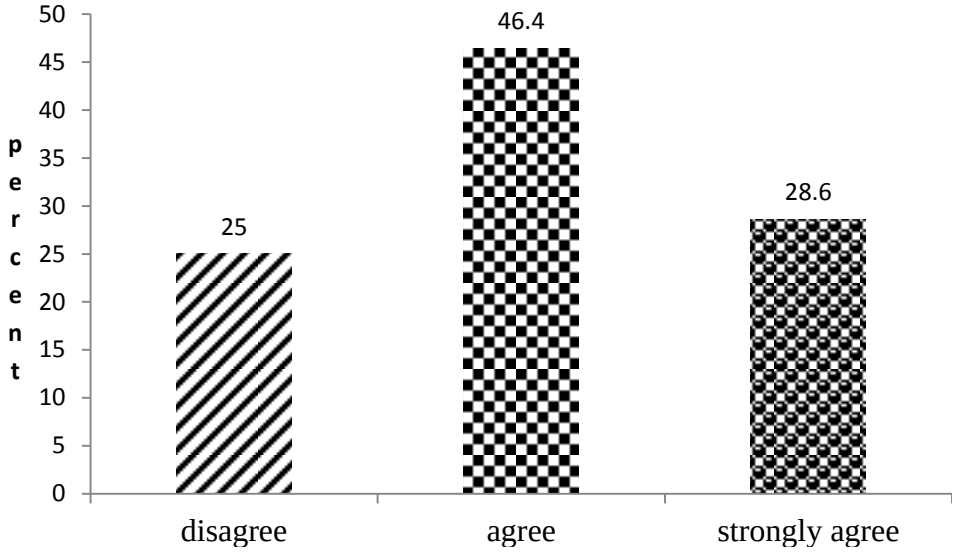


Figure 4.21: Smaller fleet of vehicles in circulation during floods

Even though 64.3% of respondents suggest that public transport is never grounded during floods, small fleet of cars are seen. In fact those cars never ply on the roads around the flooded area.

Another 21.4% were having the notion that public transport is grounded during floods due to their scarcity in the traffic (**figure 4.22).**

It is imperative that in a free market policy the higher the demand on a commodity, the higher the price. Therefore transport fares during floods increases according to 96.5% **(**see **appendix 3**) of the respondents. Both taxi and boat fares are raised especially during flood peak period. All respondents in the study (school children, parents, principals, and Key informants) unanimously agreed that there is always an increment in fares during floods. The boat captains usually increase fares for crossing to the north bank of Basse from D5 to D15 or maximum D25 (Gambia's currency). This is because the river extents to its flooded banks as far as the present market become inundated. The distance boats travel increases up to 200 metres during the peak of floods. Evidence of transport fare increment is displayed in **figure 4.23** below.

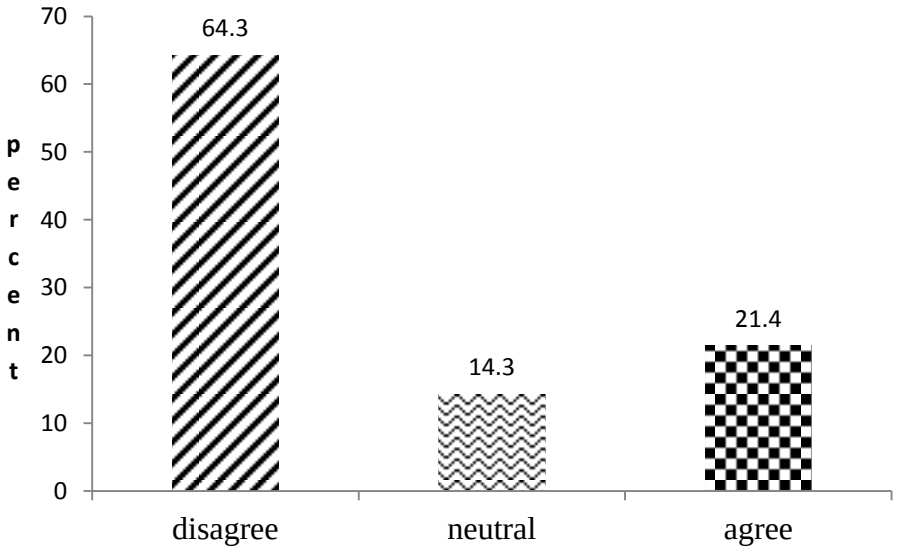


Figure 4.22: Public transport is usually grounded during floods

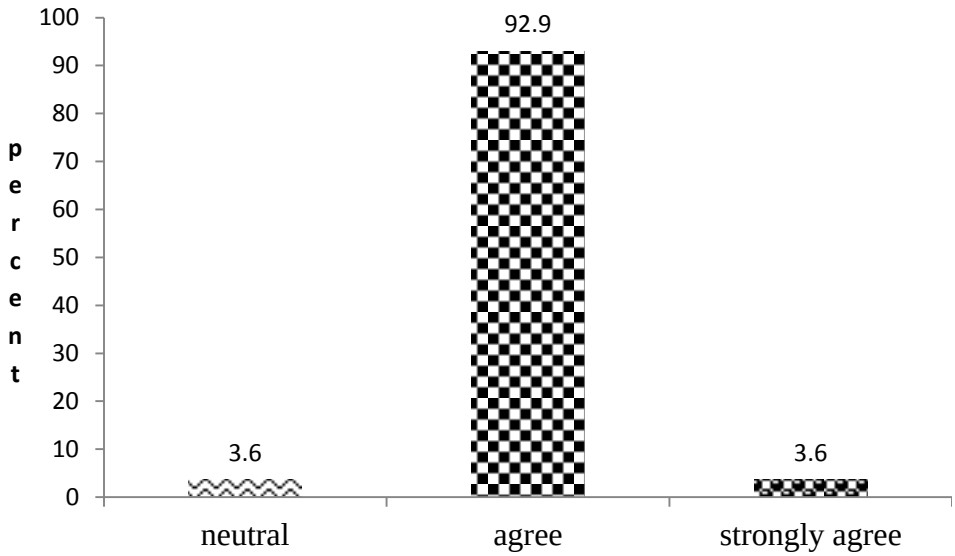


Figure 4.23: Transport fares increased during flooding

4.2.6.2: Boats availability

During the research, virtually all respondents 96.4% concur that, boats at the river crossing point remain operational during floods. Although some school children who cross daily from the north (Kerewan badala) to attend schools in Basse do not pay fares for crossing, few of them are dissuaded by their parents from making the journey to Basse during the peak flood period. Others indeed confirmed their fears about crossing during the peak flood.

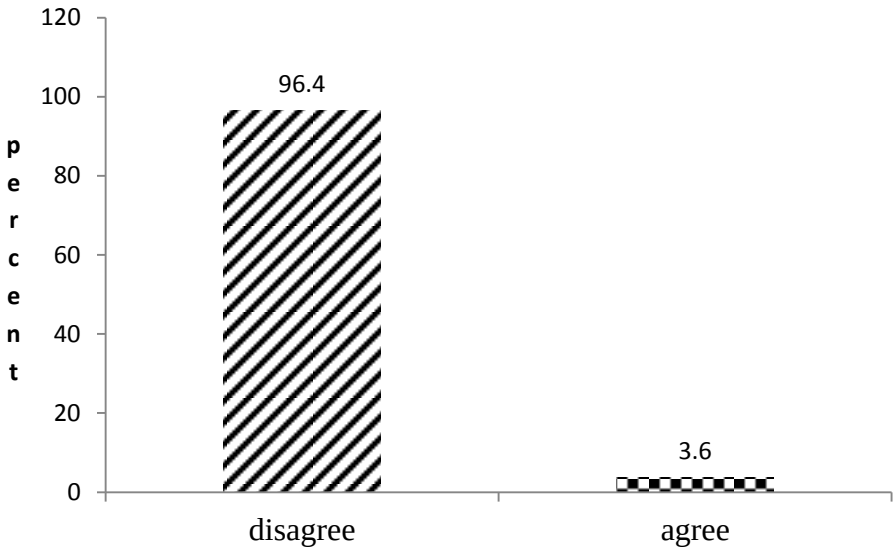


Figure 4.24: Boats are docked/at anchor during floods

4.2.6.3: Access to key services

In a similar vein, floods impact on the transport and transit systems universally impede access to key services. Banking and commerce are vital in addition to schools and health facilities. These institutions make up the basic fabric of any civilized society. Crippling any of these will severely disrupt the basic tenets of lives and livelihood. As shown in **figure 4.25**, 92.8% of respondents affirmed access restrictions to financial institutions and health facilities. Currently, key services are located outside these 2 communities, which is not a surprise because of their vulnerability to floods. Nonetheless, school children travel to other parts of the town to attend classes. During floods, some arrive late in class because of using longer routes to school. The normal dry season routes are mostly inundated and sometimes they fail to attend classes at all. These sometimes take more than three days which severely impact on their performance. Like other studies conducted elsewhere by Akello (2014) and Kavegue (2015), absenteeism from school during floods disrupts both learning experiences and educational attainment. It is the same story in accessing the banks, market and other financial institutions.

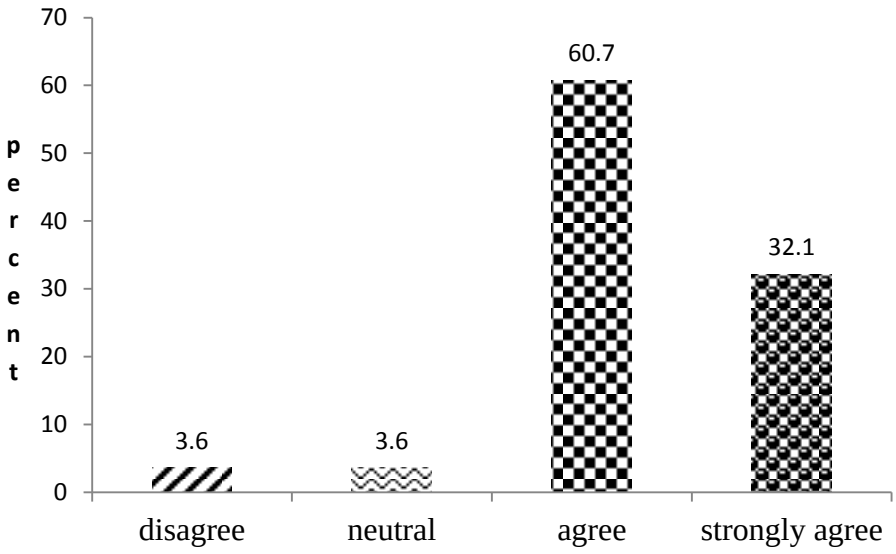


Figure 4.25: Restricted access to key service centres (education, healthcare, commerce, banking, etc.)

4.2.7: Floods impact on traded goods and services

4.2.7.1: Access to skill workers and tradesmen

As reported by the FGDs skilful workers who sell palm rum splits for roofing of houses and many other trades are carried out around the river bank. This area is first inundated any time floods hit and it becomes inaccessible. One dealer in this trade explained to the researcher. During the floods period, he usually abandons his business and resort to pushing of wheel barrow carrying luggage for people. This is how he earns a living till the floods recede. Many shops in the main market too are closed and some of the goods evacuated to safe places. Many shop keepers complain of losing huge money as a result of their goods being washed away by floods. The study is confirmed by 75% of the respondents reported that access to skilful workers and tradesmen become more difficult (refer to **figure 4.26** below).

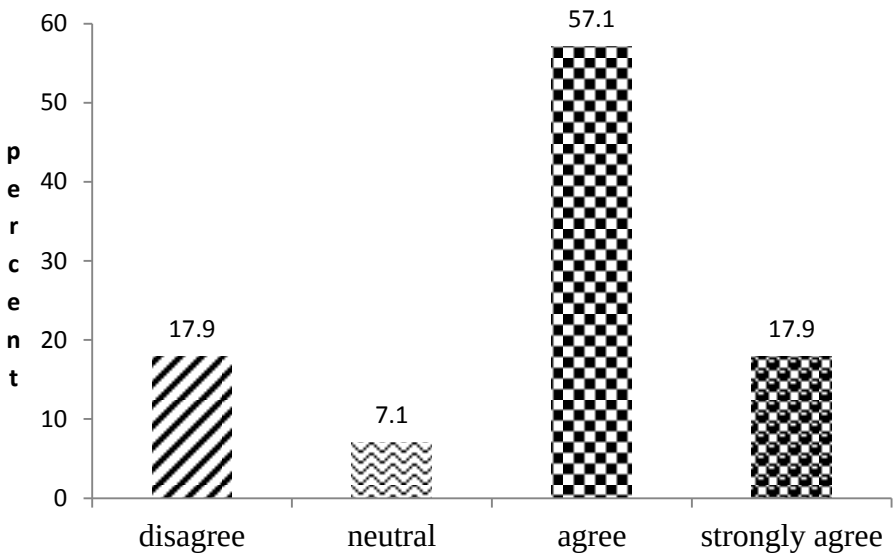


Figure 4.26: Access to skilled workers/tradesmen more difficult

4.2.7.2: Access to cooking fuel

Concerning energy for preparation of daily meals, most residence of the 2 communities uses charcoal and firewood for cooking of the household meals. There is 100% agreement from respondents that access to cooking fuel is a big problem during floods. This information is represented in **figure 4.27.** Most respondents during the FGDs stated that household meals are generally prepared using charcoal and fire wood. These materials are always affected by flooding because when they become wet, they cannot be use for cooking. Sometimes it takes days before they dry up, and if compounds are inundated you cannot have a place to spread them under sunlight.

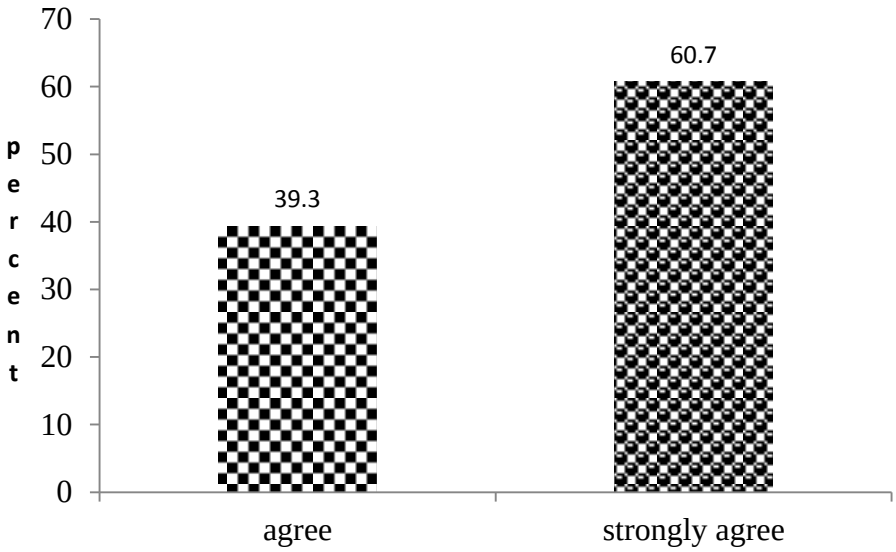


Figure 4.27: Access to cooking fuel is a big problem

4.2.8: Kinship and community support systems

4.2.8.1: Family and community assistance

Figure 4.28 shows 85.7% of participants claim extended families and community assistance is less reliable than it was a decade ago. This result therefore harmonized with the finding of a study carried out in the city of Ipswich by Brockie, *et al.,* (2016), located west of Brisbane, the state capital of Queensland, Australia. The reliability of assistance is similarly low during floods. Moreover**,** even the little assistance acclaimed, are mostly delayed until the worst effects of floods are over. Besides the succour received do not contribute to household rebuilding and recovery efforts. As in other studies, the flood-affected families were reported to be living with relatives, and neighbours. Some of them as welcomed and some as unwanted guests hence creating some crack in social milieu of kinship. From **figure 4.29** below, 82.1% of participants show assistance not contributing to recovery efforts. Therefore the flood damage is contributing to the pulling of these 2 vulnerable communities to a vicious cycle of poverty. This position was

corroborated by Kingsford, (2000) who observed that flooding of urban areas can result in significant damage to private property, including homes and businesses (Onifade *et al.*, 2014).

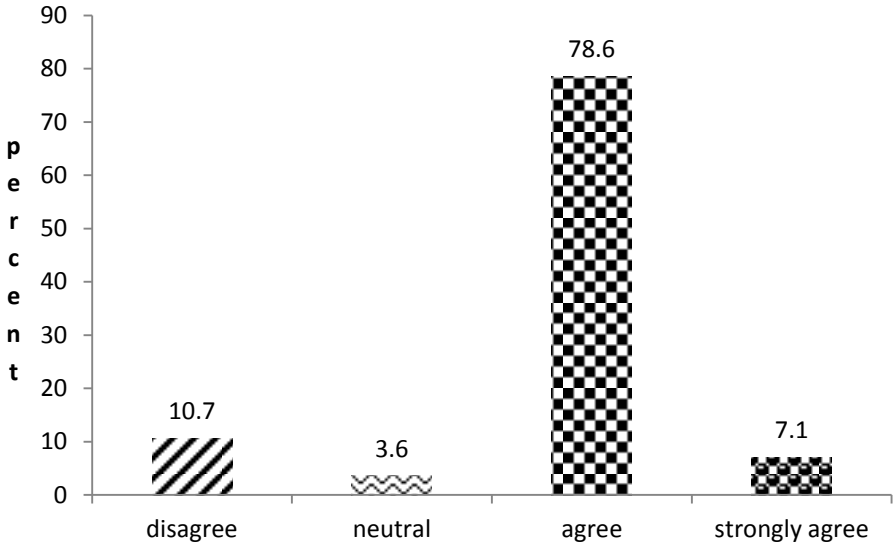


Figure 4.28: Kinship, extended family and community assistance is less reliable

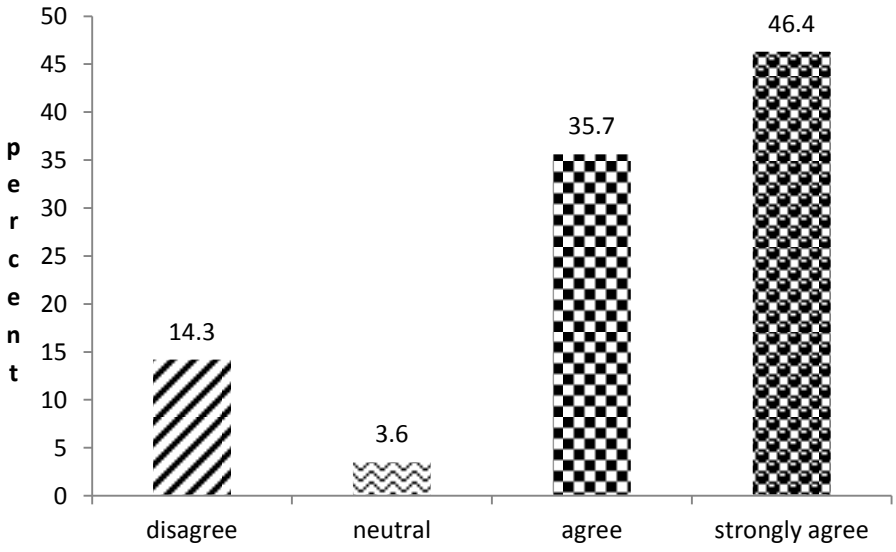


Figure 4.29: Assistance received does not contribute to household rebuilding and recovery efforts

4.3: Problems faced by school children during and immediately after floods

The survey has discovered that school children have been severely affected by riverine floods for the past years. They have encountered pertinent problems and among the outstanding ones are: access to quality drinking water; problems of feeding and nutrition; difficulty in accessing schools due to damaged roads; loss of significant learning materials; vulnerability to diseases associated with floods; and poor sanitary conditions. All these culminate to disrupt their school attendance which can translate into poor performance and eventually dropping out of school.

4.3.1: Floods constrains school children's access to drinking water

School children's access to drinking water in the 2 communities has no significant difference as indicated in **table 4.2**. The results were examined using Pearson Chi-Square test. In the test α is equal to 0.05 and if P-Value is greater than α, it means there is no significant difference. Invariably, if P-Value is less than α then, there is significant difference. In this case from the analysis in the table below shows that the calculated chi-square value is 7.989 while the table value was 0.94 at 0.05 level of significance with degree of freedom (Df) 4. Hence there is no significant difference in the manner school children access drinking water between the 2 communities. Both are equally affected in terms of water accessibility during floods. The results show 51.4% of respondents agreed there is constrains to their accessibility of drinking water. Whereas 46.3% claimed not being affected by water constrains and the remaining respondents are not clear if floods have caused any problem to water accessibility.

The FGDs further ascertain that there is a big problem concerning water availability during floods, because most homes do not have taps. Residents of the 2 communities rely heavily on street taps while others have open wells in their homes. During floods sometimes dirty flood

waters infiltrate these wells and contaminate them. A similar study confirmed this in Bangladesh during the floods of 1998 and 2004. Most of the badly affected villages suffered inundation of two thirds of drinking water sources and 97% of latrines, which led to diarrheal disease and fever in over half of the affected population (Shimi *et al.,* 2010) cited in Alderman *et al.*,(2012). Furthermore, the floods, which inundate 30% of the land area for half of the year, exacerbate shortage of clean water. Alderman, Turner, & Tong, (2012) also explained that threats to human health also exist in relation to consuming crops grown on soil which was contaminated during flood with waste water. In the last 10 years exacerbation of diarrheal disease and related mortality following floods has been observed in some African countries (Abaya *et al.,* 2009). Apart from causing diseases, other problems were discovered as caused by floods in the study area. Some streets are flooded and accessing taps becomes risky. There are instances where people resort to placing heavy stones, cement bricks and sand bags in the streets. Stepping on them to fetch water is sometimes dangerous. One can easily slip-off and fall if extra care is not taken.

Concerning water quality, the results indicated 56.1% of responses are concern because the water quality is compromised during each riverine flood in Basse. These can easily lead to outbreak of contagious disease like cholera and diarrheal. Evidence of these results can be found under **Appendix 4.**

Table 4.2: Distribution of school children access to drinking water by community

Community	Perception					Total	Pearson Chi Square	Df	P-Value
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree		7.989	4	0.92
Kaba kama	20(7.8%)	38(14.9%)	5(2.0%)	59(23.1%)	16(6.3%)	138			
Basse-Layout	11(4.3%)	49(19.2%)	1(0.4%)	46(18.0%)	10(3.9%)	117			

4.3.2: Foodstuff of school children is being destroyed by floods

In **table 4.3** below, there is evidence indicating a significant difference in the manner in which foodstuff are destroyed as can be notice in the table. Therefore the way foodstuff is damaged in the 2 communities vary to a large extend. Respondents in Kaba kama encounter greater loss of their foodstuff than their counter parts. This is not surprising to one who is familiar with the 2 communities. Kaba kama is situated at a marsh land and elevation there is lower than Basse-layout. This makes the place easily inundated coupled with the clayey soils and numerous rice fields. There are many instances where the fields are submerged including vegetable gardens. According to the FGDs, flood waters easily penetrate their food stores and kitchens soaking all grains in stock, particularly in Kaba kama.

Basse-layout on the other hand, has pockets of hills that make flood waters to move faster. The nature of continental terminal soils in the area too helps in the infiltration process. Merely a small region of this community closer to the river experiences lengthy inundation in their homes due to alluvial deposit soils. This class of soil has a huge capacity to hold water for an extended period.

The results signified 58% of the sampled population stated that foodstuff get destroyed during and immediately after floods. However, the remaining 42% were not affected. This findings echoes the results of Armah *et al.*, (2010) that reduction in food production resulting from floods also means loss of income for many in communities which further reduce their ability to purchase food and thereby contributes to increasing the problem of food shortages and starvation within households.

Table 4.3: Distribution of the 2 communities' foodstuff damaged during flooding

Community	**Perception**				**Total**	**Pearson Chi Square**	**Df**	**P-Value**
	Strongly disagree	Disagree	Agree	Strongly agree		10.093	3	0.018
Kaba kama	7(2.7%)	43(16.9%)	42(16.5%)	46(18%)	138			
Basse-Layout	7(2.7%)	50(19.6%)	41(16.1%)	19(7.5%)	117			

4.3.3: Floods affecting sanitation systems of learners.

From **table 4.4** below, the Pearson Chi- Square test insinuated that there is no significance in the relation between the 2 communities. Therefore one can infer that there is significant damaged of sanitary systems both in Kaba kama and Basse-layout. Floods have caused many toilets to be abandoned due to serious destruction. The data has signified 77.6% of those who participated in the study confirmed there sanitary facilities had been affected by floods.

Notwithstanding, there is 20.4% of the sample that have not suffered damage in their sanitary system. The remaining 2% left opted to be neutral, so one will not know if their sanitary system has been damaged or not. The study substantiate the one conducted in Bangladesh (Rahman &

Ataur, 2015), which confirmed poor access to sanitation in coastal towns is posing serious public and environmental health risk.

Table 4.4: Distribution of sanitary systems that are severely affected by floods in respect of the 2 communities

Community	**Perception**					**Total**	**Pearson Chi Square**	**Df**	**P-Value**
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree		6.165	4	.187
Kaba kama	5(2%)	19(7.5%)	1(0.4%)	62(24.3%)	51(20%)	138			
Basse-Layout	3(1.2%)	25(9.8%)	4(1.6%)	52(20.4%)	33(12.9%)	117			

4.3.4: Roads to schools are affected by floods making them difficult to access.

Another insignificant result indicated in the Pearson's Chi-Square tests between the 2 communities is regarding school roads damaged. It is clearly represented in **table 4.5;** therefore one can comfortably report that there is no significance in difference among roads damaged between the 2 localities under study. A high percentage of respondents accepted that roads to schools are severely damaged by floods. In the data presented 90.2% of the sampled population accepted this, and 9.1% disagreed that roads to school are affected by floods. The 1% missing represented those who could not confirm if the roads to school are affected by floods. The results are in tandem with others who researched on a similar topic. For example Mwape (2009) revealed that 32% of his study respondents experienced disruption in access to health services due to damaged roads and bridges induced by floods. Rahman (2014) also reiterated that floods damaged roads, and boats remain the only type of transport use to facilitate movement from

home to elsewhere during floods. This assertion was also suggested by Onifade, *et al.,* (2014) who stated that flood disaster has significant impact on roads and bridges. In contrast to a study conducted by (Mudavanhu, 2014) where school children highlighted that most of the time they miss school because they will be assisting parents to secure food for the family. This study has no report of such, but children complain of roads inaccessibility that sometime makes them absent from school. The photo in **(Plate 1)** below is an example showing the bad condition of the roads in Kaba kama which school children take to school.

Table 4.5: Distribution of damaged school roads as a result of floods by community

Community	**Perception**					**Total**	**Pearson Chi Square**	**Df**	**P-Value**
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree		1.911	4	.752
Kaba kama	4(1.6%)	7(2.75%)	1(.4%)	57(22.4%)	69(27.1%)	138			
Basse-Layout	2(.8%)	10(3.95%)	1(.4%)	51(20%)	53(20.8%)	117			

Plate 4.2: Road condition in Kaba kama taken 03/11/2017 **(source:** Author 2017)

4.3.5: Floods sometimes make school going children loss their stationery.

The loss of learning materials is obvious to impact negatively in the learning experiences and educational attainment of school children. Apparently the data has indicated 50.6% of the students sampled have once loss their stationery due to the riverine floods. Even though their schools are not directly affected, yet they are losing their learning materials either at home or on the road to and from school.

However, the manner in which their stationery is affected has a significance variation according to the Pearson Chi-Square test. The P-Value is less than α at (0.05) level of significance with degree of freedom (Df) 4 translating a significant difference between the 2 communities (**see table 4.6**)**.** Kaba kama again stand out as more severely affected than Basse-layout. This again is

reinforced by the FGDs; where more members reiterated that inundation in their homes take longer time in the latter than the former.

The school children's loss stationery during floods mostly consists of exercise and text books. Nonetheless, writing materials such as pens and pencils are reported to be washed away by floods. Mathematical set boxes with all their tools are carried along. Some of these materials are hard to replace especially by poor parents. Most importantly, if a student loss a book that contains notes gathered over a 3 year cycle, it can lead to low performance in examination. This has been corroborated by Cadag *et al.*,(2017) who stated that school supplies and other learning materials kept by students at home were affected by floods in their study. Many students living in informal settlements reported not being able to save any of their books and schools materials because their houses or communities were either completely swept away by flood or submerged in water.

This can in turn cause a disruption in the learning cycle of the child. A school head master in one of the schools covered by the study explained that, many enrolling school children come without birth certificates. He is compelled to register them without birth certificates because many of their parents reported that all their documents are washed away by floods. The same thing was heard from the FGDs. Some parents even wailed that replacing such documents become difficult as the chief usually doubts the citizenship of many applicants.

Table 4.6: Distribution of school children's loss stationery due to floods by community

Community	Perception					Total	Pearson Chi Square	Df	P-Value
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree		16.691	4	.002
Kaba kama	8(3.1%)	46(18%)	5(2%)	48(18.8%)	31(12.2%)	138			
Basse-Layout	7(2.7%)	59(23.1%)	1(.4%)	42(16.5%)	8(3.1%)	117			

4.4: Solution to flood problems and their effectiveness

School children in many parts of the globe, especially in Africa face numerous challenges including hazards such floods, which expose them to diseases, loss of food and shelter in naming just a few. Intuitively, flood damage to infrastructure and weakening of life support systems (such as food, sanitation, water and housing systems of learners), which will severely affect school children by impeding their potentials to excel in school. These will impact negatively on both their learning experiences and educational attainment

Floods in the study area have been recurring over the years. From the data collected, both communities are engaged in finding solutions to the problems caused by this hazard. Other stakeholders like Gambia Red Cross Society (GRCS), village development groups, and National Disaster Management Agency (NDMA), and other government entities have tried in many ways to ameliorate the situation. However, all these efforts are not specifically directed to help school children. Nonetheless, if solutions to the problems are realized, school children will also benefit from them. Some of the main actions taken by civil society groups, school authorities and community members are discussed herein.

4.4.1: Community members' engagement in removing blockage from water channels

Figure 4.30 below show 71.4% of the sampled population agreed that members of the communities usually engaged in removing blockage from water cannels. This activity will surely allow water to flow easily through the channel instead of spreading over into compounds. Unfortunately when the researcher went round there was numerous waste materials dumped in the water channel. Even at the culvert (about 150 metres) from the river there was waste dumped in it. The 19.2% of respondents stated that community members only engage in cleaning the blockage when there is a monthly cleansing imposed by the former president. Moreover, few people participate in it, and now that the regime is no more, people have stopped the exercise. This is not helping in the removal of blockage in water ways.

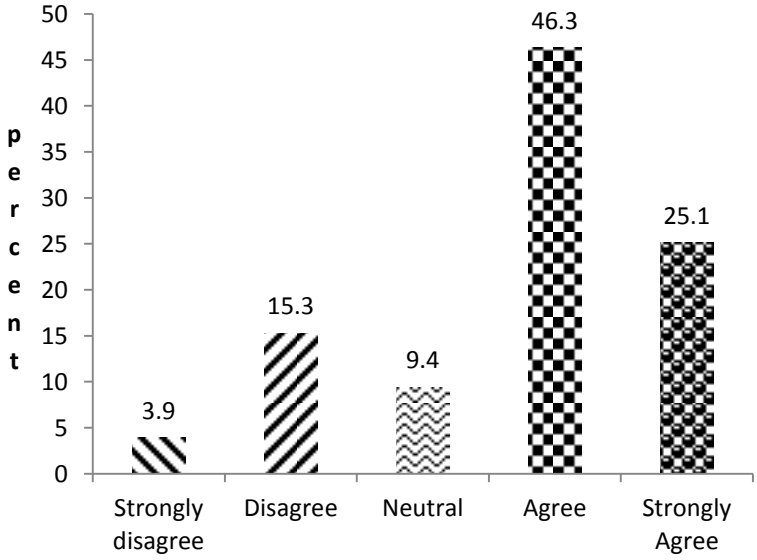


Figure 4.30: Community members are usually engaged in removing blockage from water channels

4.4.2 Provision of boats to make access to schools easier from flooded areas

During the peak of floods in the study area, the river extends its bank up to 150 metres into the market. Transportation of goods and people is ideally by boats within the inundated area, but half of respondents argued that boats are not provided to make access to schools easier from flooded areas. Thirty-one percent of the sampled population claimed that sometimes boats are made available. The remaining quarter of respondents maintained that boats are provided during floods to facilitate easy movement of school children to access their schools (see **figure 4.31**). Unlike the MRC in Basse where 2 special boats equipped with life jackets are hired during the period to transport their staff, school children are at the mercy of boat captains to access their schools. No wonder this will surely delay attendance of lessons, or even cause absenteeism.

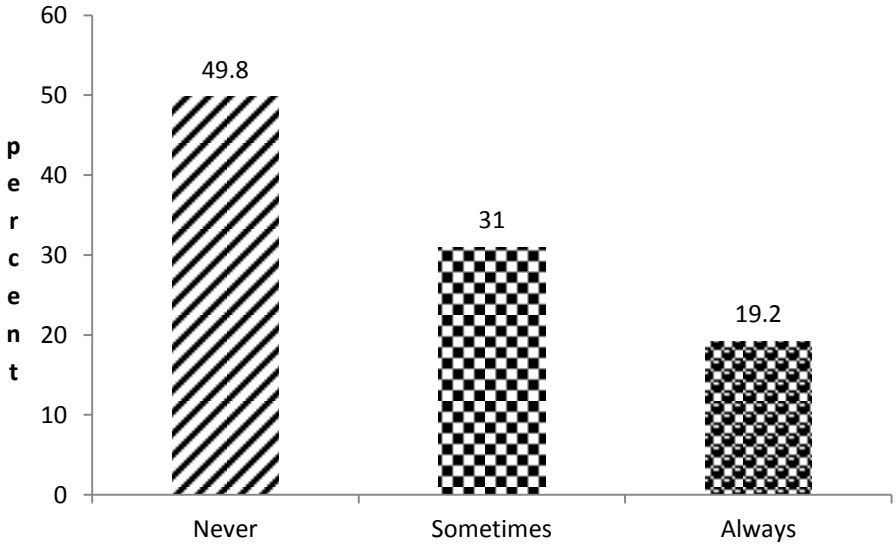


Figure 4.31: Boats are provided to make access to schools easier from flooded areas

Plate 4.3: Inundation of the main market in Basse showing the streets only accessible by boats

Source: MRC archives 2016

4.4.3 Building dykes and sand bags to control floods

Like many others who experience floods, school children among their community members engaged in building dykes and sand bags to control floods. The data revealed 86.6% of participants (in **figure 4.32**) agreed that they actively engage in controlling floods from entering their homes. Unfortunately their efforts have not prevented them from the flood hazards. One of the key informants explained that the cause of floods in Basse is from rainfall run-off, from the interior and neighboring Senegal. These waters flow into the river Gambia and cause flooding around the ferry crossing point in Basse. The researcher trekked the river bank and saw two water outlets where the river flows through into the communities when its volume rises. Interestingly a third outlet is developing between the already existing two (see pictures of these three attached) under **appendix 5**. Some participants in the FGDs blamed Boto's construction company that constructed the main highway in Basse. They believe it resulted to blocking of numerous water exit ways especially in Basse layout.

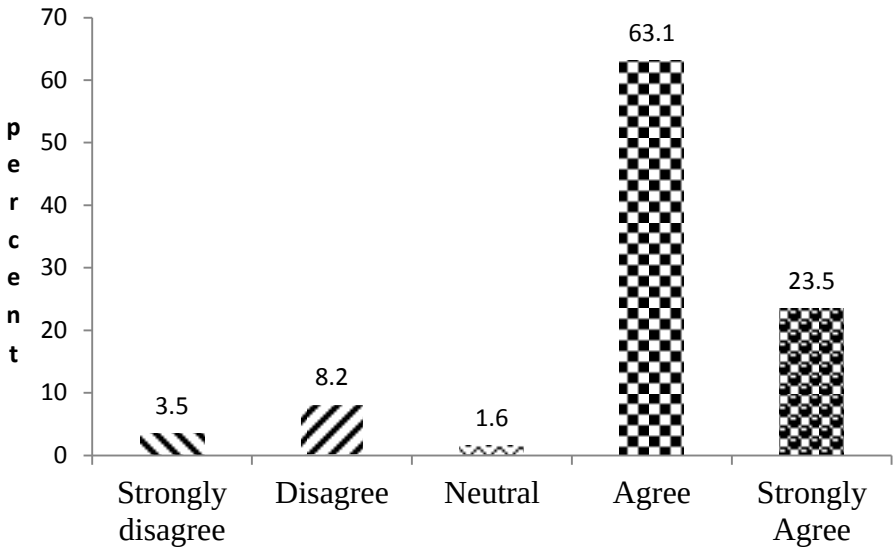


Figure 4.32: Show students building dykes and sand bags to control floods

4.4.4: Civil society and school authorities give support during floods

Concerning support given to victims during floods, the data indicated 71.4% of respondents confirmed support is given to school children (see **appendix 4**). But were quick to add especially from the FGDs that the support is far less than the damaged accrued. On the other side 19.2% said that support is not given by these groups. Whatsoever, it is clear from the data that a lot need to be done if one is to succeed in helping students hit by floods. It also worth to note a point raised by the Red Cross Regional Officer during the in-depth interview. He said that there is no share for school children during any relief aid in the region. Students benefit only from shares given to household heads, thus materials for students are virtually absent in any relief aid.

Schools authorities' support to victims is limited to sensitization of students on flood issues. Floods victims are also counselled by the school to relief them of their pressure accumulated due to floods. The other groups mentioned by respondents to have supported flood victims are: RDMA (30.3%), neighbours (24.7%), GRCS and Fire service (15.7% each), and relatives

(5.6%), wealthy people in the community example Hamidou Jah of Jah Oil Company (4.5%), and Village Disaster Management Committee (VDMC) 3.4% (refer to **figure 4.33)**. The support given is in the form of relief aid materials (example buckets, detergents, second hand clothing, rice, oil, cement, and first aid treatments etc.), sensitization, rescue operation, and evacuation. Neighbors are also actively engaged in removal of water from rooms and compounds.

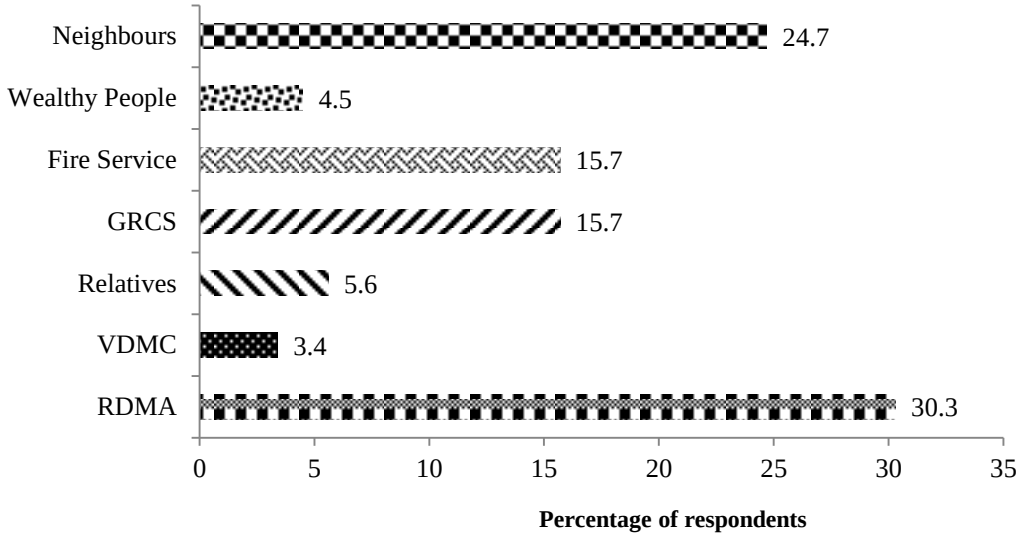


Figure 4.33: Civil Society, Community groups and individuals who give support to flood victims

4.4.5: Teaching about floods in the school curriculum

From **figure 4.34** below 63.6% of responses agreed that learners in schools are taught about floods in various subjects. Some said they learn about floods in Agricultural Science, others in Social and Environmental Studies and the rest in General Science. Regardless of that most of them said they only learn very little about floods in those subjects. Such narrow understanding

cannot equip them to be able to live with floods. The survey among school heads further confirmed none of them have ever undergone any training on how to live with floods. Therefore it will be impossible to equip students with the necessary skills and knowledge on how to escape and be less vulnerable to floods.

Various researches carried out globally recognized the need to integrate climate change in schools' curriculum. This will make the fight against the phenomenon more successful or design a climate change curriculum to be taught in schools. The Gambia National Communication, (2003) report recognises the need to include climate change Education in the school curriculum as it is virtually absent. And when school children learn about natural hazards like floods, it will not only help them to be flood resilience. However, they will also educate their parents and other siblings on how to respond to such hazards. These will make their communities less vulnerable to floods and improve their adaptive capacities as they are continuously exposed to floods risk. For example the "Unite4Climate" (is a child-led advocacy program that empowers 11-17 year olds in 10 of Zambia's provinces to become climate ambassadors), is actively engage in sensitization of over a million community members about natural hazards including floods (NCC, 2003). These more than 1000 ambassadors are all school going children.

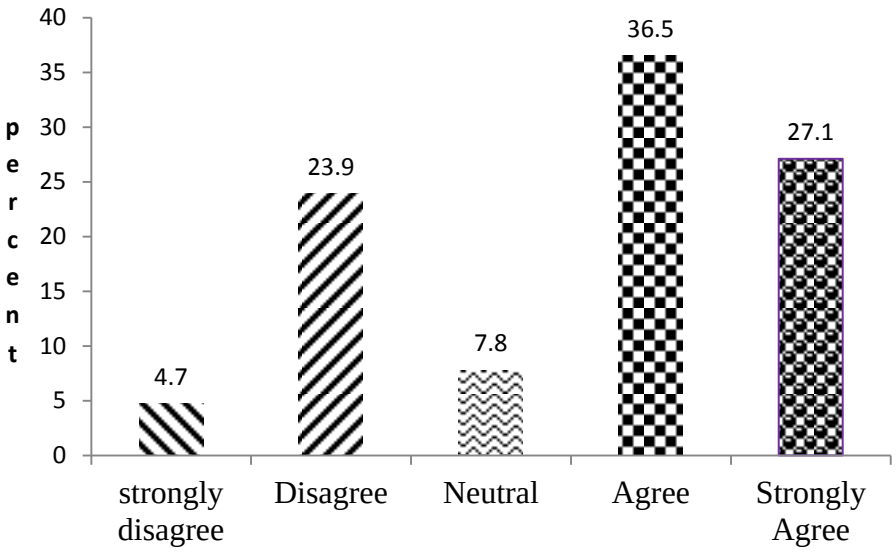


Figure 4.34: Flood is being taught in the school curriculum

4.4.6 Prompt evacuation of floods victims including school children to safe places.

The survey also like many others conducted in flood prone regions, have alluded many students including their families have been evacuated to other residential areas during floods. This happens because their homes were destroyed and are not suitable for living. The analysis show results revealing 65% (**appendix 3**) of the sample were once evacuated to a new place. Majority of them have been evacuated to a neighbor's house. The implication of these large numbers of victims sharing rooms with their neighbors will stretch the meager resources available. It will further exacerbate their vulnerability to transmittable diseases. Some are taken to rental houses where they pay for themselves and others move to relative's house. The remaining victims in small numbers move out of Basse or relocate to a community's Nursery School called 'Chikambas' (see this information under **figure 4.35**).

Those victims who move out of Basse include the non-Gambian employees of MRC and those who have residence in the interior or Guinea Conakry. These categories of victims are reported to have their school going children miss valuable learning hours. As stated by the MRC Operation Manager (Basse camp), sometimes the non-Gambian employees relocate to Fajara MRC Camp till the floods recedes. This takes on average 30 days during which their children will not be going to school. Though mostly it happens during summer holidays, but the latter stage of the floods drags to the first week of the school new calendar (i.e. in the latter part of September). The implication is that, a child's absents in school translate to loss of learning hours, and low performance in exams. Both learning experiences and educational attainment may be affected as well.

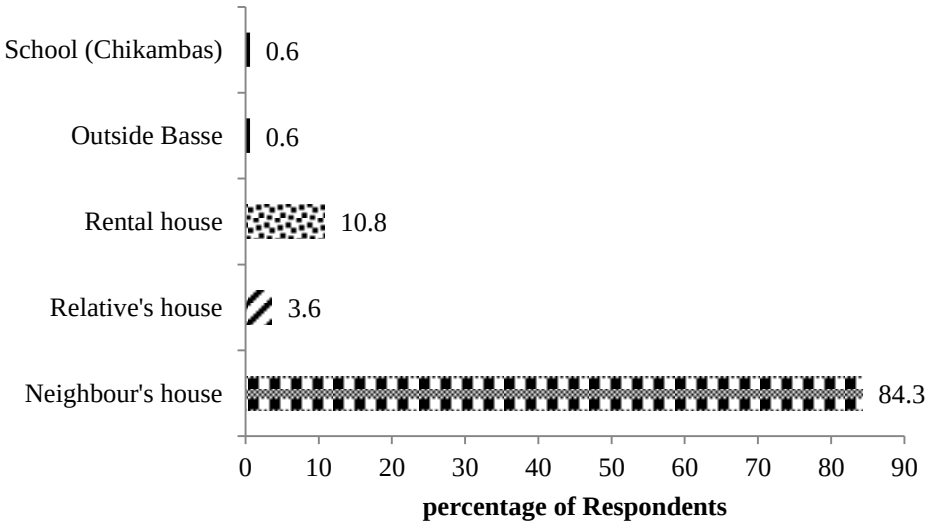


Figure 4.35: show where respondents have evacuated to during floods

4.4.7: Arrangement of remedial classes for lost learning / contact hours

With regards to lost learning/contact hours 76.5% (**figure 4.36**) of those under studied affirm there are remedial classes organized to compensate for the lost time. These will help learners to cover up syllabus and revise key point for better understanding. The outcome of which will be outstanding results that will be par with other students in non-flood prone regions.

Notwithstanding, the remedial classes are now becoming difficult to maintain as stated by one head teacher. The double shifting for shortage of teachers and classrooms is a problem for students to stay for extra classes. The other alternative they have is to conduct summer classes which mostly are affected by rains and floods. Some parents are low earners and cannot afford payment for extra classes for their children. All these are eating up into the extra classes that schools in the study are rendering to students.

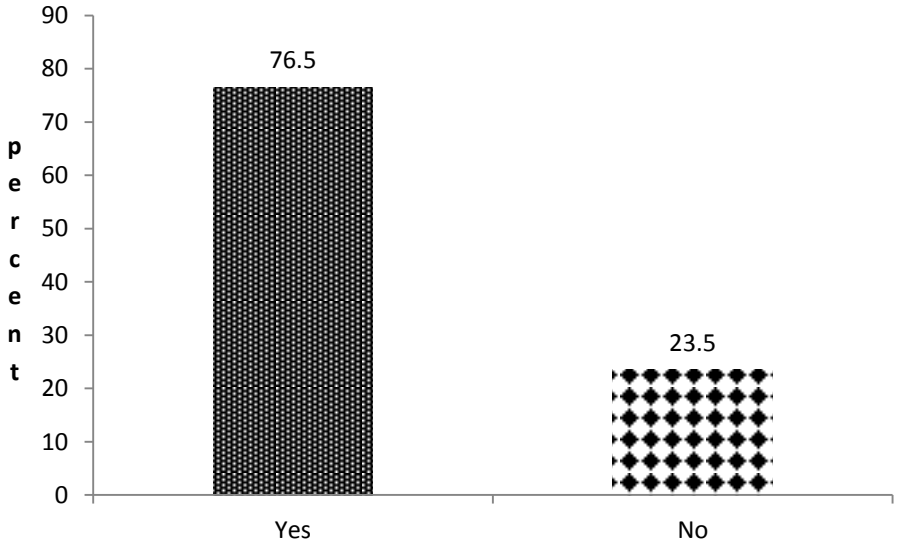


Figure 4.36: Conduct of remedial classes for lost learning / contact hours

4.4.8: Guidance and counselling units in schools

Guidance and counselling units are very significant in schools. They help school children to make good choices in field specialization and overcome problems that may affect their concentration in class. These units will be excellent in helping flood victims whose home are shattered, because parents may loss valuables and feel depressed that they abuse their children too. Students may suffer severe stress during and even after floods for losing friends, food and stationery amongst other. As observed by Mason *et al.,* (2010), mental health disorders most commonly found in people affected by natural disasters such as floods are Post-Traumatic Stress Disorder (PTSD), followed by depression and anxiety. These could negatively impact on the performance of school children. A well-established counselling unit in school could easily notice such students and give them good couching to relief them of such pressure. The data has indicated 78% of the school children interviewed said they have guidance and counselling unit that give service to them (see **figure 4.37** below). Notwithstanding, in one of the schools, the author saw an office labelled "Guidance and counselling unit", which was stock with broken furniture and full with cob-web. This shows that it is not operational. When he asked respondents when last the office was use, none could tell. In fact some respondents who came to the school two years ago said not since they came to the school.

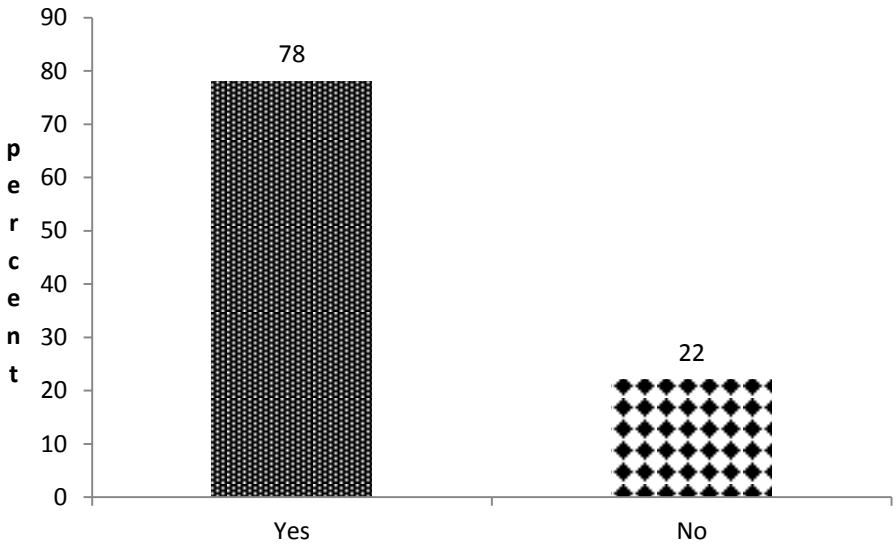


Figure 4.37: Guidance and counselling service unit in the school

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

This final chapter of the thesis provides a summary of content in previous chapters with particular emphasis on research findings, reports on key conclusions drawn from the research, and makes suggestions for follow-up by researchers and policymakers.

5.1 Summary

The main thrust of the research was to examine flood impacts on the lives of school children in the Upper River Region administrative capital, Basse. Two neighbourhoods within Basse, that is Kaba kama and Basse Layout were specifically selected for the study because of their historical experience in riverine flooding. The study was guided by three research objectives: the first sought to assess flood damages on the life support systems of school children; the second sought to identify problems faced by school-going children during floods in the study area; and the third, to evaluate measures taken by civil and school authorities and other organized groups to help school children overcome their problems during floods.

The study was carried out using descriptive survey were information is collected by interviewing or administering questionnaires to a sample of individuals. The sample was composed of 255 school children, 28 parents, seven (07) school headmasters/principals and three (03) regional education officials. The following key informants were also interviewed in the study: One (01) NDMA officer, one (01) GRCS officer, and one (01) Health Centre Officer. The main instruments for data collection were questionnaires, key informant interviews, FGDs and ground-thruthing including observation and photography.

Based on information gathered from questionnaires, key informant testimonies, and focus group discussions, riverine floods were not found to directly affect schools in the area. School heads' testimonies on this issue, are independently corroborated by school children who participated in the survey. This is in sharp contrast to what is happening in Bangladesh, Nepal, Sindh province (India), Zambia, Kenya and Nigeria. However, this study established that some school children have been severely affected by floods hitting their homes. Those residences of Kaba kama, Basse-Layout and Kerewan Badala are mostly affected. In the same vein, roads to and from schools are severely affected by floods.

Crucially, the study revealed that practically all the life support systems of school-going children living in Kaba kama, and Basse-Layout are moderately to severely affected by floods. Only estimated losses and damages to food system and stationery in households within the two communities show a significance variation under the chi square tests. Specifically, Kaba kama residences were found to be more severely affected by floods than those in Basse-Layout. Other key life support systems of school children that were severely affected during flood years include water and sanitation system, health delivery system, transport and transit system, housing and physical environment, civil protection system, and trade in goods and services.

Even though schools in Basse are normally closed during the seasonal flooding as a matter of policy, it was recognized that floods disrupted and/or damaged the life support systems of learners. These impacted negatively on the learning experiences and educational attainment of students from the two localities. Nine out of 10 asserted that poor roads condition, sickness and diseases, damage of physical structures, as well as disruption of basic essential services, all attributable to floods culminate in greater school absenteeism rates. When absenteeism extends to teachers, empirical studies supported by findings in this research suggest a strong likelihood of

low syllabus coverage and poor performance of school children in examinations. However, floods in the study area have not caused children to drop out of school unlike in Asia, (e.g. Pakistan), Sudan and Zimbabwe.

During floods, which sometimes extend into the beginning of the new academic year (mostly at the latter part of September), parents are reluctant to allow their children to go to school. The younger ones attending Lower Basic Schools and those crossing the River Gambia from Kerewan Badala, rather than getting parental permission to go to school, are mostly grounded at home. The FGDs signalled that young children could be carried away by the fast-flowing floodwaters or get bitten by snakes carried along by running waters. Until such time that floodwaters sufficiently subside, some parents have to escort their children to school and return to collect them at the end of the school day, this routine is considered by others to be time-consuming and not worth the effort.

On measures taken to address flood problems, both civil society groups and school authorities are actively engaged in helping students overcome their problems. Unfortunately, most of their efforts are thwarted by political interferences, lack of resources and the requisite skills to handle flood induced problems. Indeed, none of the school administrators who participated in the study has received any form of training related to floods issues. By contrast, officials responsible for coordination of disaster management efforts have demonstrated capacity to enumerate flood victims and assess the damages incurred. Nonetheless, approximately two out of three respondents (65%) affected by floods decry never receiving assistance or relief aid when it was distributed in the past. Complainants blamed this state of affairs to bias, political interference in the distribution.

5.2 Conclusions

From the foregoing, the author draws the following conclusions:

1) Schools in Basse that are part of this study are located outside flood-prone areas and this shields them from direct flood damage;

2) School children are still affected by floods through different ways including damage to individual family houses, disruption of their life support systems including water and sanitation system, health delivery systems;

3) Flooded roadways, high river levels and absence of transport in particular represent key obstacles to mobility and access to educational establishments;

4) Forced absenteeism of school children could be both demotivating and stressful to children and some teachers contributing to poor performance and educational attainment of children; and

5) Flood recovery challenges are too extensive for the communities to manage on their own. External assistance is required for recovery from flood events, but distribution falls short of expectation of majority

5.3 Recommendations

Having regard for the study findings and conclusions drawn therefrom, the author draws the attention of policymakers, educational planners and researchers to the following recommendations:

1) Floods be treated as disruptive events in the school calendar and taken into account when national examining bodies are setting earliest and latest dates for examinations;

2) Flood relief be made more child-friendly to cater for specific needs of school children in aid packages handed over to recipient households;

3) Carry out exploratory research as to why some parents cannot afford the time to escort their children to school; and

4) Investigate options for improved delivery of public services routinely disrupted by floods.

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APPENDICES

Appendix 1: Research tools

1a: Student's Questionnaires

My name is Demba Baldeh. I am a master's research student studying climate change and Education at the University of The Gambia. I am conducting a study in fulfilment of a requirement of my studies.

This survey will help determine the impacts of floods on the lives of school going children in Basse. I kindly request you to fill this questionnaire. Please answer the questions as honestly and as truthfully as possible by ticking or filling 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.

Section 1: Personal Information

No.	Question	Response choice	Coding
1.	What is your age in years?	Below 13 = 1	
		From 13 to 15 = 2	
		Above 15 = 3	
2.	What is your sex?	Male = 1	
		Female = 2	
3.	Where do you live?	Kaba kama = 1	
		Layout = 2	
4.	What is your parent's occupation?		

Section 2: Problems faced by school children during and immediately after (maximum 2 weeks) floods

5. Flooding constrains school children's access to drinking water.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

6. Flooding affects quality of your drinking water

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

7. Roads to school are affected by floods.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

8. You are sometimes prevented from going to school by flooding.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

9. Floods sometimes make you lose your stationery.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

10. When floods happen you sometimes suffer from illnesses related to floods.

1. Yes ( ) 2. No ( ) 3. I can't tell ( )

11. If yes, what kind of illnesses do you suffer from (tick as many as required)

a. malaria b. Asthma c. diarrhoea d. other (please specify) ……

12. Food availability is affected by floods in my area.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

13. Foodstuff gets destroyed during floods.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

14. If you agree with the statement above, explain your view. ……
……

15. Your fellow students drop out of school as a result of riverine floods.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

16. Floods affect sanitation systems

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

17. Waste overflows and bad smells disturb learners.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

18. Transportation fares increases during and immediately after floods.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

19. Participation in paid work prevents you from fully engaging in school work

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

20. Do you get on well with other household members during floods?
1. Yes ( ) 2. No ( )

21. Do you get on well with classmates during floods?
1. Yes ( ) 2. No ( )

22. Do you get on well with teachers during and immediately after floods?
1. Yes ( ) 2. No ( )

23. What kind of problems do you have with other people?
……

24. Have you ever been injured during flooding?
1. Yes ( ) 2. No ( )

25. Are you exposed to dangerous stranded animals like snakes and crocodiles during flooding?
1. Yes ( ) 2. No ( ) 3. I do not know ( )

Section 3: Solution to flood problems and their effectiveness

26. Is there any school feeding program for you?
1. Yes ( ) 2. No ( )

27. Is the school feeding program disrupted by floods?
1. Yes ( ) 2. No ( )

28. Do you receive food aid when floods strike Basse?
1. Yes ( ) 2. No ( ) 3. I can't tell ( )

29. Community members are usually engaged in removing blockage from water channels
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

30. Boats are provided to make access to schools easier from flooded areas.
1. Never 2. Sometimes 3. Always

31. You usually build dykes and sand bags to control floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

32. School authorities and civil society groups usually remove debris from routes to school.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

33. Civil society and school authorities give you support during floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

34. Support given is adequate.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

35. You are promptly evacuated to safe places during floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

36. If you agree, can you tell me where you have evacuated to?
a. Neighbour's house b. School c. Public village evacuation house d. Others (please specify) …….

37. National Disaster Management Agency (NDMA) gives you assistant that commensurate with damages caused by floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

38. You are taught about floods in the school curriculum
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

39. The content of floods in the curriculum is adequate to address flood issues
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

40. Do you seek health care when you become ill due to floods?
1. Yes ( ) 2. No ( )

41. If yes, you are diagnosed and prescription given
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

42. If no, what prevented you from seeking for health care?.....

43. What measures has the school taken to prevent damage in future?.....
44 What measures has the school taken to ensure that exams are not disrupted by floods in future?.....

45. When classrooms are flooded, are there other locations for learning?
1. Yes ( ) 2. No ( )

46. When playing grounds are flooded, are there alternative playing grounds for the students?

1. Yes ( ) 2. No ( )

47. Did you ever receive external support after a flood?

1. Yes ( ) 2. No ( )

48. If yes, which civil society group do you access for immediate help when your household is affected by flood?

a. Regional Disaster Management Agency b. Village Disaster Management Committee
c. Youth Union d. Red Cross Association
e. Urgent Reaction Team (eg. Fire Station) f. Religious bodies
g. Others (specify) …….....

49. What are the actions taken by that group to deal with flooding? ……

50. Do you think that the actions taken by the group can effectively reduce the impacts of flooding?

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

51. Please give your reasons.

……

52. What do you think the school authorities and civil society groups can do to better help school children during and after the period of flooding?

During……
After……..……

53. Do you use waterproof bags during floods?

1. Yes ( ) 2. No ( )

54. Are there remedial classes for lost learning / contact hours?

1. Yes ( ) 2. No ( )

55. Is there any guidance and counselling unit in the school? 1. Yes ( ) 2. No ( )

56. If yes, does it give assistance to students in need? 1. Yes ( ) 2. No ( )

Date …… Name of Interviewer……

1b: Principal's Questionnaire

My name is DembaBaldeh. I am a master's research student studying climate change and Education from the University of The Gambia. I am conducting a study in fulfilment of a requirement of my studies.

This survey will help determine the impacts of floods on the lives of school going children in Basse. I kindly request you to fill this questionnaire. Please answer the questions as honestly and as truthfully as possible by ticking or filling 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.

This questionnaire has four sections. You are required to answer all questions as per the given instructions. Your personal information is not required.

Section 1: Personal information

Indicate your choice by marking the appropriate block with **X**

1. Name of school you are heading……

2. GPS Coordinates: |___|___| |___|___| |___||___|

3. What is your sex? 1. Male ( ) 2. Female ( )

4. How long have you been in this school?

a. Below 1 Year ( ) b. 2-5 years ( ) c. 6-10 year ( ) d. 11- 15 years ( ) e. more than 15 years ( )

Section 2: Annual and learning cycle impacts

5 Has this school ever been affected by disruptive flood? 1. Yes ( ) 2. No ( )

6. How many times since you are here?
   a. None b.1-3 times c. 4-6 times d. More than 7 times

7. When floods occur is there any damage caused to the moveable and immoveable assets?
   1. Yes ( ) 2. No ( )

8. If yes which physical assets are most affected? (Tick no more than 2)
   a. access roads ( ) b. Playgrounds ( ) c. Classrooms ( ) d. Toilets ( ) e. Furniture ( )

9. Have text books and documents been destroyed by floods in the past? 1. Yes ( ) 2. No ( )

10. When floods occur are classrooms flooded? 1. Yes ( ) 2. No ( )

11. If yes how does this affect learning? ……

12. When floods occur, are classrooms used as shelter by the neighboring communities?

1. Yes ( ) 2. No ( )

13. Are teachers absent from school during floods? 1. Yes ( ) 2. No ( )

14. Do students miss school when there are floods? 1. Yes ( ) 2. No ( )

15. How long do the students stay away from school during floods?
a. Less than 1 week ( ) b. 1-2 weeks ( ) c. 3-4 weeks ( ) d. more than 4 weeks ( )

16. Have floods led to students dropping out of school? 1. Yes ( ) 2. No ( )

17. Have students from this school ever transferred to other schools as a result of floods?
1. Yes ( ) 2. No ( )

18. Has the school calendar ever been disrupted by riverine floods? 1. Yes ( ) 2. No ( )

19. If yes how long those this closure take in average?
a. Less than 1 week ( ) b. 1-2 weeks ( ) c. 3-4 weeks ( ) d. more than 4 weeks ( )

20. What challenges face teachers when the school is flooded? …….

21. What challenges face students when their homes are affected by flood? ……

22. Students fail to turn up for assessments during and immediately after floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

23. School children encounter more health issues during and immediately (at most 2 weeks) after floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

24. School children are injured as a result of flood damage to the environment and structures.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

25. Enrolment of school children is affected by floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

26. Performance of students/pupils are affected by floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

27. Floods affect completion of the school syllabus?
1. Yes ( ) 2. No ( ) 3. I do not know ( )

28. Floods affect completion of learning cycle (Grades1-6, 7-9, and 10-12)
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

Section 3: Problems faced by school children during and immediately after (maximum 2 weeks) floods

29. Flooding constrains school children's access to drinking water
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

30. Flooding affects the quality of drinking water in the school
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

31. Roads to school are affected by floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

32. Transportation becomes scarce leading to increase in fares.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

33. School children are prevented from coming to school by flooding
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

34. School children lose their stationery to floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

35. School children are exposed to numerous diseases anytime flood occurs.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

36. If yes what kind of illnesses do they suffer from (tick as many as required)
a. malaria b. Asthma c. diarrhoea d. other (please specify)……

37. Feeding of school children become difficult when floods strike.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

38. Foodstuff gets destroyed during floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

39. If you agree with the statement above, explain your view. ……

40. Floods affect sanitation systems
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

41. Waste overflows and bad smells disturb learners
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

42. School children participation in paid work prevents them from fully engaging in school work
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

43. School children show signs of stress during and immediately after floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

44. Are school children exposed to dangerous stranded animals like snakes and crocodiles during flooding?
1. Yes ( ) 2. No ( ) 3. I do not know ( )

Section 4: Solution to flood problems and their effectiveness

45. Is there any school feeding program for school children?
1. Yes ( ) 2. No ( )

46. Is the school feeding program disrupted by floods?
1. Yes ( ) 2. No ( )

47. Community members engaged in removing blockage from water channels
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

48. Boats are provided to make access to schools easier from flooded areas.
1. Never 2. Sometimes 3.Always

49. School children built dykes and sand bags to control floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

50. School children use waterproof bags during floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

51. School authorities and community members remove debris from routes to school.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

52. Civil society and school authorities give support to students affected by floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

53. Support given to victims is adequate
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

54. School children are taught about floods in their curriculum
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

55. The content of floods in the curriculum is adequate to address flood issues
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

56. School children who become ill due to floods usually seek health care.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

57. School children who become ill are diagnosed and prescription given.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

58. When classrooms are flooded, arrangements for learning are made to different locations.
1. Yes ( ) 2. No ( )

59. When playing grounds are flooded, are there alternative playing grounds for the students?
1. Yes ( ) 2. No ( )

60. Did the school ever receive external support after a flood?
1. Yes ( ) 2. No ( )

61. If yes, which civil society group do you access for immediate help when your school is affected by flood? .....

a. Regional Disaster Management Agency
b. Village Disaster Management Committee
c. Youth Union
d. Red Cross Association

e. Urgent Reaction Team (eg. Fire Station) f. Religious bodies
g. Others (specify) …….....

62. What are the actions taken by that group to deal with flooding? ……..

63. Do you think that the actions taken by the group can effectively reduce the impacts of flooding?
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

64. Please give your reasons……
65. Have you ever undergone specific training on how to live with floods?

1. Yes ( ) 2. No ( )

66. What do you think the school authorities and civil society groups can do to better help

school children during and after the period of flooding?

During……
After……..……
67. What measures has the school taken to prevent damage in future? …….

68. What measures has the school taken to ensure that exams are not disrupted by floods in future? .....

69. Is there any guidance and counselling unit in the school? 1. Yes ( ) 2. No ( )

70. If yes, does it give assistance to students in need? 1. Yes ( ) 2. No ( )

Date:……

1c: Questionnaires for Parents of school children under study

My name is Demba Baldeh. I am a master's research student studying climate change and Education at the University of The Gambia. I am conducting a study in fulfilment of a requirement of my studies.

This survey will help determine the impacts of floods on the lives of school going children in Basse. I kindly request you to fill this questionnaire. Please answer the questions as honestly and as truthfully as possible by ticking or filling 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.

1. GPS Coordinates: |___|___| |___|___| |___||___|

Section 1: Personal Information

No.	Question	Response choice	Coding
2.	What is your age in years?	Below 20 = 1	
		From 20 to 45 = 2	
		Above 45 = 3	
3.	What is your sex?	Male = 1	
		Female = 2	
4.	Where do you live?	Kaba kama = 1	
		Layout = 2	
5.	Which ethnic group do you belong to?	Fula = 1	
		Mandinka = 2	
		Sarahule = 3	
		Other = 4	

6. Occupation (Tick anyone applicable)	with **X**
Legislators, Senior Officials and Managers	
Professionals	
Technicians and Associate Professionals	
Clerical Support Workers	
Services, Shop & Market sales workers	
Agricultural Workers	
Craft and Related trade workers	
Plant/ Machine Operators	
Elementary occupations	
Other	

7. Do you own a vehicle? 1. Yes ( ) 2. No ( )

Section 2: Flood occurrence & characteristics

8. How many times in the last 10 years has your house/compound ever been flooded by river channel overflow?
   a. 0 time b. 1-3 times c. 4-6 times d. More than 6 times

9. What is the most common flood depth when your house is affected?

a. 0.00 metre b. 0.01 – 0.25 metre c. 0.26 – 0.75 metre d. more than 0.75 metre

Section 3: Strain placed by floods on school children's life support systems

10. Food systems (production, transportation, exchange)

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Household access to basic flood supplies is disrupted					
Household food rations are reduced					
Livestock is lost					
Food in storage is rendered unfit for human consumption					
Home/Kitchen gardens are destroyed					
Flood a factor in increase of prices of basic commodities					
Crop harvest losses anticipated					

11. Waste and Sanitation systems

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Normal source of potable water compromised or inaccessible					
Water from alternative source less desirable					
Water from alternative source less abundant					
Normal sanitary facility compromised or inaccessible					
Alternative sanitary facility less hygienic					

12. Healthcare delivery systems (infrastructure, personnel, therapeutic procedures, A&E)

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Out-patient capacity exceeded (people queuing outside at point of consultation)					
In-patient capacity exceeded (patients on floor, more patients than beds)					
Injured and sick not evacuated in timeous manner					
Medication prescribed not dispensed by health facility					
Floods related diseases are prevalent during and immediately after (2 weeks) floods					

13. Housing and physical environment

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Living quarters and detached utility structure suffer major damages from floods					
Damp conditions persist for at least one month after flood recession					
Grounds are covered with algal growth after flood recession					

14. Civilian protection system

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Police response to callouts unacceptably slow					
Fire service and rescue response to emergencies unacceptably slow					
Children safety is big concern (relative to middle-aged, and elderly)					
Criminality is more pronounced during flood periods (relative to non-flood period/dry season)					
Disaster Management to flooding inadequate					
Civil defence/volunteer teams lack resources and leadership					

15. Transport and transit systems (mobility)

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Smaller fleet of vehicles in circulation					
Public transport grounded					
Transport fares increased					
Boats docked/at anchor					
Restricted access to key services centres (education, healthcare, commerce, banking, etc)					
Restricted access to place of economic activity/work					

16. Trade in goods and services

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Access to skilled workers/tradesmen more difficult					
Access to cooking fuel is a big problem					

17. Kinship and community support systems

	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree. 5=Strongly Agree				
	1	2	3	4	5
Kinship, extended family and community assistance is less reliable than it was a decade ago					
Reliability of assistance from relatives, extended family and the community is low during floods					
Assistance from relatives, extended family and the community is mostly received after the worst effects of a flood are over.					
Assistance received does not contribute to household rebuilding and recovery efforts					

Section 4: Supplementary information

18. Apart from foodstuff, can you enumerate valuable you remember losing as a result of the floods

    ……
    ……

19. What is the estimated value of valuables enumerated above?

……
……

20. Have anyone in your household going to school suffered from illnesses as a result of flooding?
    a. a. Yes b. No c. Can't remember

21. If yes, what kinds of flood-related illnesses have he/she/they suffered from? (the answer can be more than one)
    a. Diarrhoea b. Skin diseases c. Asthmatic attack d. Others (please specify……..

22. Do you normally seek medical care for any of these illnesses? Yes ( ) No ( )

23. If yes, how much on average do you spend in dalasi for such medical care?.....

……
……

24. How many days in the year of worst flooding you experienced were you unable to go to work?

a. 0 days b. 1- 3 days c. 4 – 7 days d. 8 – 14 days e. > 14 days

25. How much income did you lose due to absence from work/forced cessation of economic activities?
    a. D0 b.D1- D500 c. D501 – D1,000 d. D1,001 – D2,000 e. > D2,000

Section 5: Problems faced by school children during and immediately after (maximum 2 weeks) floods

26. Do you have a child who goes to school? 1. Yes ( ) 2. No ( )

27. Flooding constrains your children's access to drinking water
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

28. Flooding affects the quality of drinking water in your household.
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

29. Roads to school are affected by floods
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

30. Transportation becomes scarce leading to increase in fares.
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

31. School children are prevented from going to school by flooding
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

32. School children lose their stationery to floods
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

33. School children are exposed to numerous diseases anytime flood occurs.
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

34. If yes what kind of illnesses do they suffer from (tick as many as required)
    a. malaria b. Asthma c. diarrhoea d. other (please specify)……

35. Feeding of school children become difficult when floods strike.
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

36. Foodstuff gets destroyed during floods.
    1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

37. If you agree with the statement above, explain your view……
……

38. Floods affect sanitation systems
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

39. Waste overflows and bad smells disturb learners
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

40. School children participation in paid work prevents them from fully engaging in school work
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

41. School children show signs of stress during and immediately after floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

42. Your school children's interaction with other household members is negatively affected during flooding.
1. Yes ( ) 2. No ( )

43. Please explain…….....
……

44. Have your school children ever been injured during flooding?
1. Yes ( ) 2. No ( )

45. Are your school children exposed to dangerous stranded animals like snakes and crocodiles during flooding?
1. Yes ( ) 2. No ( ) 3. I do not know ( )

46. School children become drop outs as a result of riverine floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

Date of investigation:_____/_____/_____ Name of interviewer: ----------

1d: Interview Guidelines for Regional Education Officers

My name is DembaBaldeh. I am a master's research student studying climate change and Education from the University of The Gambia. I am conducting a study in fulfilment of a requirement of my studies.

This survey will help determine the impacts of floods on the lives of school going children in Basse. I kindly request you to fill this questionnaire. Please answer the questions as honestly and as truthfully as possible by ticking or filling 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.

This questionnaire has four sections. You are required to answer all questions as per the given instructions. Your personal information is not required.

Section 1: Personal information

Indicate your choice by marking the appropriate block with X

1. Name of your institution ……...

2. What is your sex? 1. Male ( ) 2. Female ( )

3. How long have you been in this office?

a. Below 1 Year ( ) b. 2-5 years ( ) c. 6-10 year ( ) d. 11- 15 years ( ) e. more than 15 years ( )

Section 2: Annual and learning cycle impacts

4. Have schools in Basse ever been affected by disruptive riverine flood? 1. Yes ( ) 2. No ( )

5. Which schools are most affected by floods in Basse? Name them

……

6. How many times since you are here?
   a. None b. 1-3 times c. 4-6 times d. More than 7 times

7. When floods occur is there any damage caused to the moveable and immoveable physical assets?
   1. Yes ( ) 2. No ( )

8. If yes which physical assets are most affected? (Tick no more than 2)
   a. access roads ( ) b. playgrounds ( ) c. classrooms ( ) d. Toilets ( ) e. furniture ( )

9. When floods occur are classrooms flooded? 1. Yes ( ) 2. No ( )

10. If yes how does this affect learning?

……

11. Have text books and other documents been destroyed by floods in the past?
1. Yes ( ) 2. No ( )

12. When floods occur, are classrooms used as shelter by the community or neighboring communities? 1. Yes ( ) 2. No ( )

13. Are teachers absent from school during floods? 1. Yes ( ) 2. No ( )

14. Do students miss school when there are floods? 1. Yes ( ) 2. No ( )

15. How long do the students stay away from school during floods?

a. Less than 1 week ( ) b. 1-2 weeks ( ) c. 3-4 weeks ( ) d. more than 4 weeks ( )

16. Have floods led to students dropping out of school? 1. Yes ( ) 2. No ( )

17. Have students from any of the schools in Basse ever transferred to another school as a result of flood?
1. Yes ( ) 2. No ( )

18. Are schools closed when their immediate environment is flooded? 1. Yes ( ) 2. No ( )

19. If yes how long those this closure take on average?
a. Less than 1 week ( ) b. 1-2 weeks ( ) c. 3-4 weeks ( ) d. more than 4 weeks ( )

20. Students fail to turn up for assessments during and immediately after floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

21. School children are exposed to more health issues during and immediately (at most 2 weeks) after floods.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

22. School children are injured as a result of flood damage to the environment and structures.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

23. Enrolment of school children is affected by floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

24. Performance of students/pupils are affected by floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

25. Floods affect completion of the school syllabus?
1. Yes ( ) 2. No ( )

26. Floods affect completion of learning cycle (Grades1-6, 7-9 and 10-12)
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

27. What challenges face teachers when the school is flooded?

……

28. What challenges face students when their homes are affected by flood?

……...

Section 3: Problems faced by school children during and immediately after (maximum 2 weeks) floods

29. Flooding constrains school children's access to drinking water
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

30. Flooding affects the quality of drinking water in schools.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

31. Roads to school are affected by floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

32. Transportation becomes scarce leading to increase in fares.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

33. School children are prevented from going to school by flooding
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

34. School children lose their stationery to floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

35. School children exposed to numerous diseases anytime flood occur
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

36. If yes what kind of illnesses do they suffer from (tick as many as required)
a. malaria b. Asthma c. diarrhoea d. other (please specify)……

37. Foodstuff gets destroyed during floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

38. If you agree with the statement above, explain your view. ……

39. Floods affect sanitation systems
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

40. Waste overflows and bad smells disturb learners
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

41. School children participation in paid work prevents them from fully engaging in school work
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

42. School children are faced with stressful situation during floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

43. If yes please explain your view……..

44. Are your school children exposed to dangerous stranded animals like snakes and crocodiles during flooding?
1. Yes ( ) 2. No ( ) 3. I do not know ( )

Section 4: Solution to flood problems and their effectiveness

45. Is there any school feeding program for school children?
1. Yes ( ) 2. No ( )

46. Is the school feeding program disrupted by floods?
1. Yes ( ) 2. No ( )

47. Community members engaged in removing blockage from water channels
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

48. Boats are provided to make access to schools easier from flooded areas.

1. Never 2. Sometimes 3.Always

49. School children built dykes and sand bags to control floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

50. School authorities and community members remove debris from routes to school.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

51. Civil society and school authorities give support to students affected by floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

52. Support given to victims is adequate
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

53. School children are taught about floods in their curriculum
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

54. The content of floods in the curriculum is adequate to address flood issues
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

55. School children who become ill due to floods usually seek health care.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

56. School children who become ill are diagnosed and prescription given.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

57. When classrooms are flooded, arrangements for learning are made to different locations.
1. Yes ( ) 2. No ( )

58. When playing grounds are flooded, are there alternative playing grounds for the students?
1. Yes ( ) 2. No ( )

59. Did your office ever receive external support after a flood?
1. Yes ( ) 2. No ( )

60. If yes, which civil society group do you access for immediate help when schools in your region are affected by flood? (Tick more than one if applicable)

a. Regional Disaster Management Agency b. Village Disaster Management Committee

c. Youth Union d. Red Cross Association
e. Urgent Reaction Team (eg. Fire Station) f. Religious bodies
g. Others (specify) …….....

61. What are the actions taken by that group/those groups to deal with flooding?
……

62. Do you think that the actions taken by the group can effectively reduce the impacts of flooding?
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

63. Please give your reasons. ……

64. Have you ever undergone specific training on how to live with floods?

1. Yes ( ) 2. No ( )

65. What do you think the school authorities and civil society groups can do to better help school children during and after the period of flooding?

During……
After……..……

66. What measures has your office taken to prevent damage in future?…….
……

67. What measures has your office taken to ensure that exams are not disrupted by floods in future?.....

Date:……

1e: Interview Guidelines for Key Informants

My name is Demba Baldeh. I am a master's research student studying climate change and Education from the University of The Gambia. I am conducting a study in fulfilment of a requirement of my studies.

This survey will help determine the impacts of floods on the lives of school going children in Basse. I kindly request you to fill this questionnaire. Please answer the questions as honestly and as truthfully as possible by ticking or filling 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.

This questionnaire has three sections. You are required to answer all questions as per the given instructions. Your personal information is not required.

Section 1: Personal information

Indicate your choice by marking the appropriate block with X

1. Name of your institution……

2. What is your sex? 1. Male ( ) 2. Female ( )

3. How long have you been in this institution?

a. Below 1 Year ( ) b. 2-5 years ( ) c. 6-10 year ( ) d. 11- 15 years ( ) e. more than 15 years ( )

Section 2: Problems faced by school children during and immediately after (maximum 2 weeks) floods

4. Flooding constrains school children's access to drinking water
   1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

5. Flooding affects the quality of drinking water in schools.
   1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

6. Roads to school are affected by floods
   1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

7. Transportation becomes scarce leading to increase in fares.
   1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

8. School children are prevented from going to school by flooding

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

9. School children lose their stationery to floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

10. School children exposed to numerous diseases anytime flood occur
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

11. If yes what kind of illnesses do they suffer from (tick as many as required)
a. malaria b. Asthma c. diarrhoea d. other (please specify)……

12. Foodstuff gets destroyed during floods.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

13. If you agree with the statement above, explain your view……...
……

14. Floods affect sanitation systems
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree
15. Waste overflows and bad smells disturb learners
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

16. School children participation in paid work prevents them from fully engaging in school work
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

17. School children are faced with stressful situation during floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

18. If yes please explain your view……..

19. Are school children exposed to dangerous stranded animals like snakes and crocodiles during flooding?
1. Yes ( ) 2. No ( ) 3. I do not know ( )

Section 3: Solution to flood problems and their effectiveness

20. National Disaster Management Agency (NDMA) gives assistant that commensurate with damaged caused by floods.

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

21. Do you provide financial support to flood victims especially students
1. Yes ( ) 2. No ( )

22. Do you provide food aid to flood victims?
1. Yes ( ) 2. No ( )

23. Support given to victims is adequate
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

24. Community members engaged in removing blockage from water channels
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

25. Boats are provided to make access to schools easier from flooded areas.
1. Never 2. Sometimes 3.Always

26. School children built dykes and sand bags to control floods
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

27. School authorities and community members remove debris from routes to school.
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

28. Floods victims are promptly evacuated to safe places
1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

29. If you agree, can you tell me where they are evacuated to?
a. Neighbour's house b. School c. Public village evacuation house d. Others (please Specify) …….

30. Did your office ever receive external support after a flood?
1. Yes ( ) 2. No ( )

31. If yes, which civil society group do you access for immediate help when this region is affected by flood? (Tick more than one if applicable)

a. Disaster Management Secretariat
b. Village Disaster Management Committee
c. Youth Union
d. Red Cross Association
e. Urgent Reaction Team (eg. Fire Station)
f. Religious bodies

g. Others (specify) …….....

32. What are the actions taken by that group/those groups to deal with flooding?
……

33. Do you think that the actions taken by the group can effectively reduce the impacts of flooding?

1. Strongly disagree 2. Disagree 3.Neutral 4. Agree 5. Strongly Agree

34. Please give your reasons. ……..

35. Have you ever undergone specific training on how to live with floods?

1. Yes ( ) 2. No ( )

36. What do you think the school authorities and civil society groups can do to better help school children during and after the period of flooding?

During……
……
After……..……
……

37. What measures has your office taken to prevent damage in future?…….
……

Date:…… Name of Interviewer……

Appendix 2: Acceptance to conduct a survey on school children and head teachers

REPUBLIC OF THE GAMBIA
MINISTRY OF BASIC AND SECONDARY EDUCATION
REGIONAL EDUCATION DIRECTORATE
REGION SIX
30th October 2017

To: Demba Baldeh

UTG student

Faculty of Education

Subject: **response to permission request**

I am directed to acknowledge the receipt of your letter dated 26th October 2017 asking for permission to carry out educational research within the region. You are hereby informed that permission has been granted for you to proceed on with your education research and also be assured of this office unflinching support to enable you carry out your research successfully.

Yours faithfully,

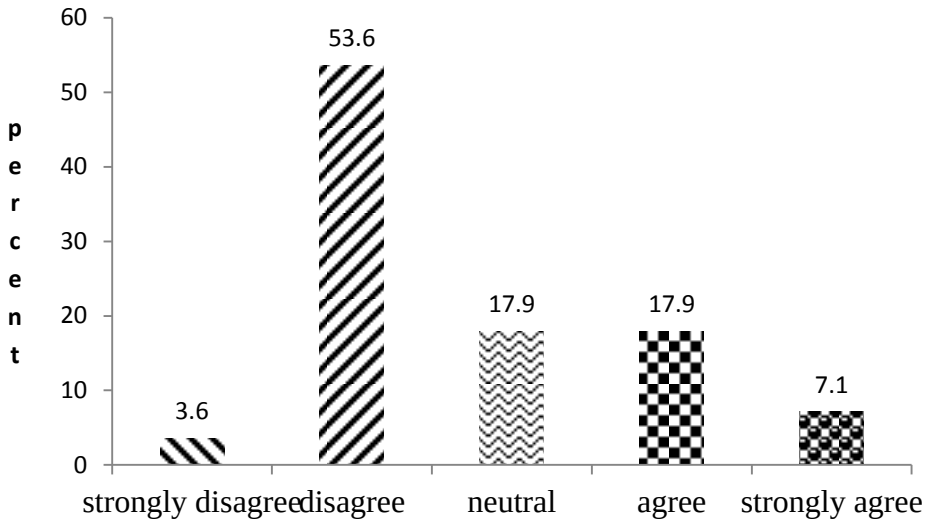
Sign:----------

Muhammed p mballow

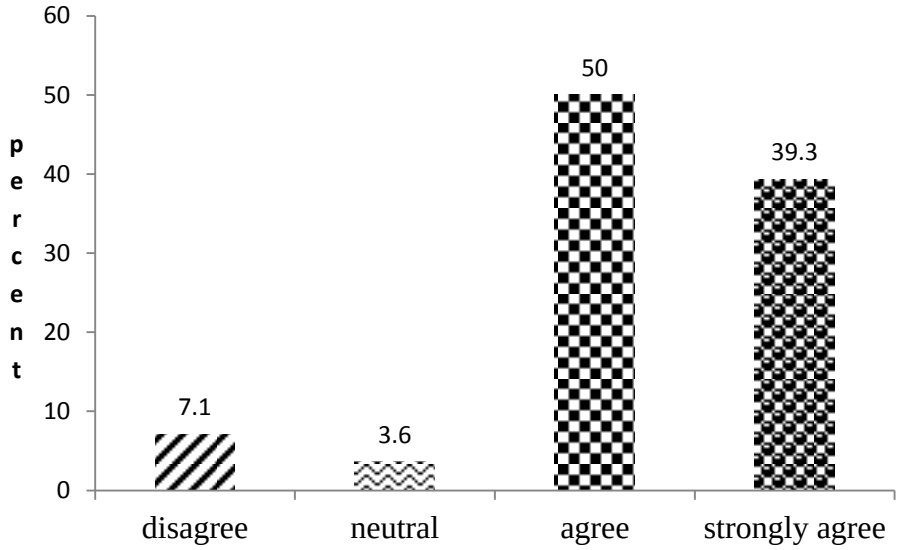
Cc : Director RED6

File

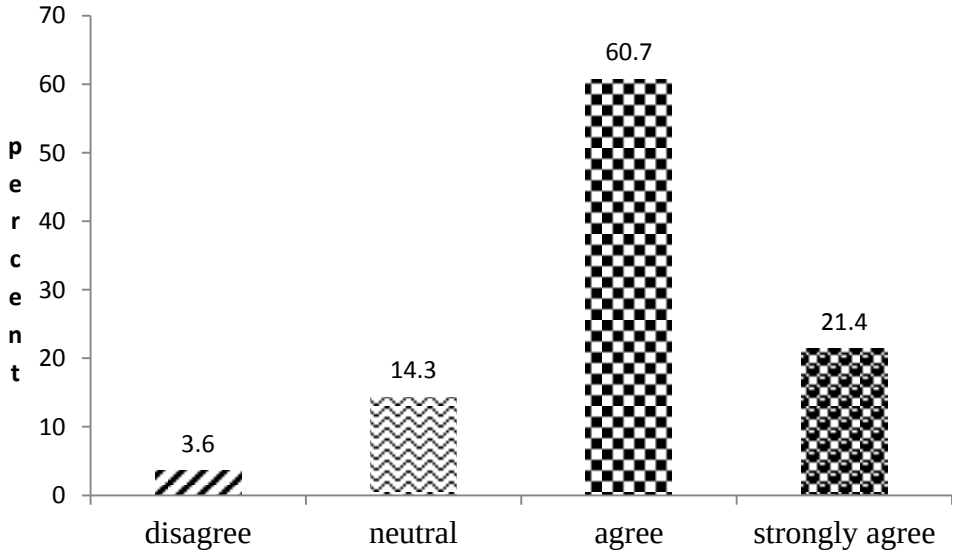
Appendix 3: Objective one descriptive statistics results



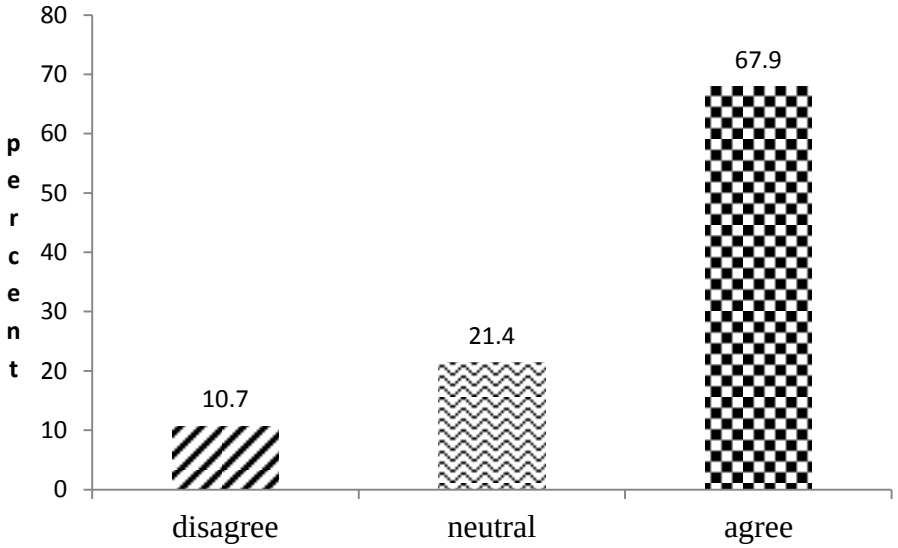
Showing response on water from alternative source being less abundant



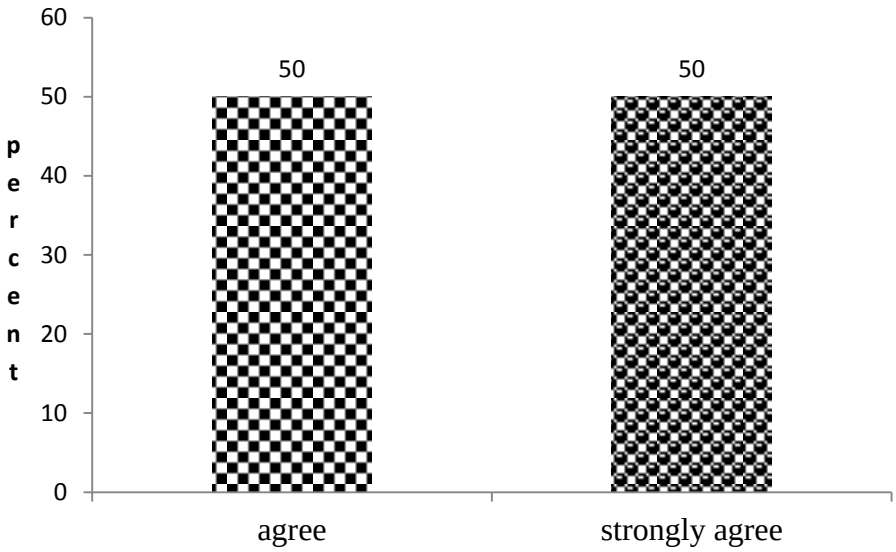
Alternative sanitary facilities are less hygienic



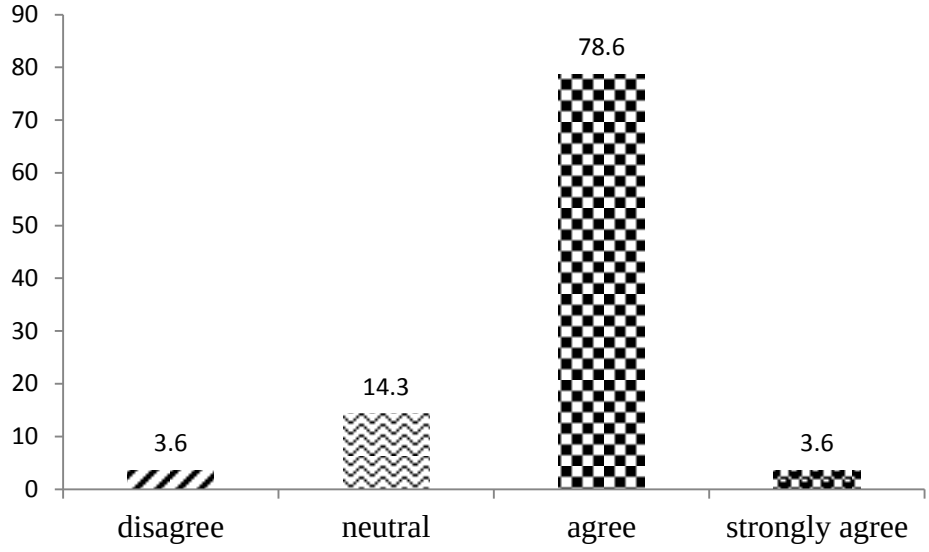
Floods related diseases are prevalent during and immediately after floods



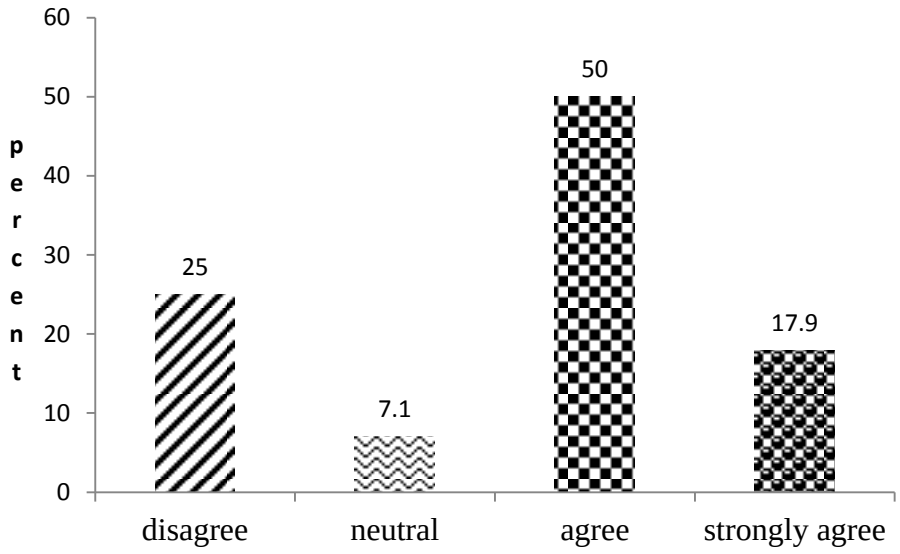
Civil defence/volunteer teams lack resources and leadership



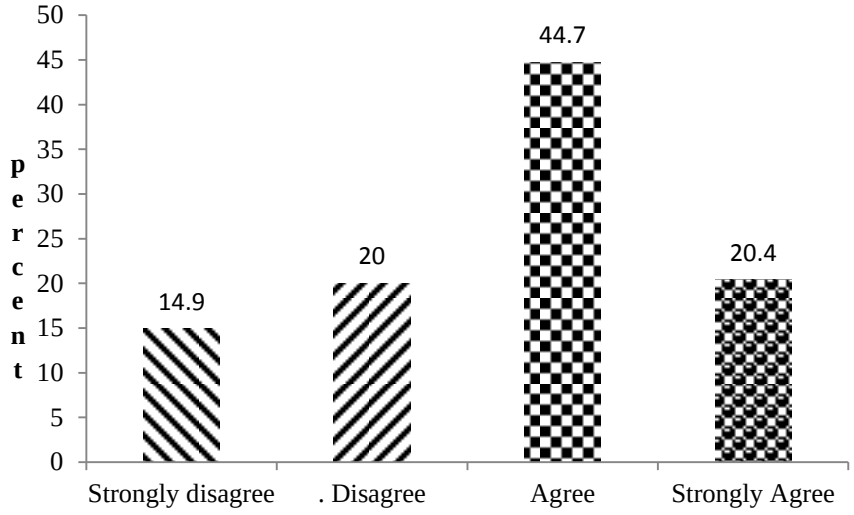
Restricted access to place of economic activity/work



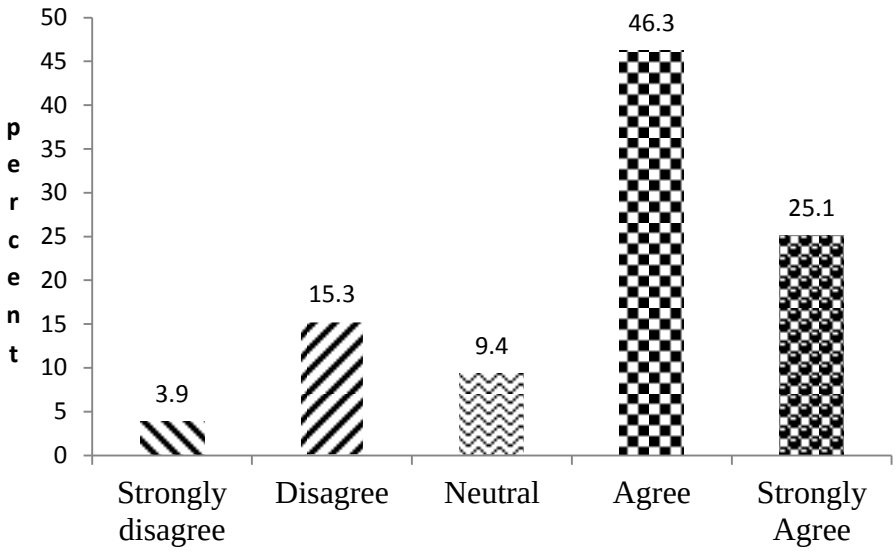
Reliability of assistance from relatives, extended family and the community is low during floods



Assistance from relatives, extended family and the community is mostly received after the worst effects of a flood are over



Prompt evacuation of respondents to safe places during floods



Support given to flood victims during and after flooding

Appendix 4: Chi square results on flood tested variables for objective 2

Crosstab

			Flooding affects quality of your drinking water		
			Strongly disagree	Disagree	Neutral
Where do you live?	Kaba kama	Count	14_a	42_a	3_a
		% within Where do you live?	10.1%	30.4%	2.2%
		% of Total	5.5%	16.5%	1.2%
	Layout	Count	11_a	38_a	4_a
		% within Where do you live?	9.4%	32.5%	3.4%
		% of Total	4.3%	14.9%	1.6%
Total		Count	25	80	7
		% within Where do you live?	9.8%	31.4%	2.7%
		% of Total	9.8%	31.4%	2.7%

Crosstab

			Flooding affects quality of your drinking water		Total
			Agree	Strongly Agree	
Where do you live?	Kaba kama	Count	58_a	21_a	138
		% within Where do you live?	42.0%	15.2%	100.0%
		% of Total	22.7%	8.2%	54.1%
	Layout	Count	49_a	15_a	117
		% within Where do you live?	41.9%	12.8%	100.0%
		% of Total	19.2%	5.9%	45.9%
Total		Count	107	36	255
		% within Where do you live?	42.0%	14.1%	100.0%
		% of Total	42.0%	14.1%	100.0%

Each subscript letter denotes a subset of Flooding affects quality of your drinking water categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.735[a]	4	.947
Likelihood Ratio	.736	4	.947
Linear-by-Linear Association	.115	1	.734
N of Valid Cases	255		

Item Statistics

	Mean	Std. Deviation	N
Household access to basic flood supplies is disrupted	3.6786	.81892	28
Household food rations are reduced	3.8571	.70523	28
Livestock is lost	3.1071	1.34272	28
Food in storage is rendered unfit for human consumption	3.7143	1.11744	28
Home/Kitchen gardens are destroyed	4.1071	.73733	28
Flood a factor in increase of prices of basic commodities	3.4286	.83571	28
Crop harvest losses anticipated	4.3214	.72283	28
Normal source of potable water compromised or inaccessible	3.6429	.91142	28
Water from alternative source less desirable	4.1071	.83174	28
Water from alternative source less abundant	2.7143	1.04906	28
Normal sanitary facility compromised or inaccessible	4.0000	.81650	28
Alternative sanitary facility less hygienic	4.2143	.83254	28
Out-patient capacity exceeded (people queuing outside at point of consultation	4.2143	.41786	28
In-patient capacity exceeded (patients on floor, more patients than beds)	4.1786	.61183	28

Item Statistics

	Mean	Std. Deviation	N
Injured and sick not evacuated in timeous manner	3.7500	1.00462	28
Medication prescribed not dispensed by health facility	3.2857	.76290	28
Floods related diseases are prevalent during and immediately after (2 weeks) floods	4.0000	.72008	28
Living quarters and detached utility structure suffer major damages from floods	3.5000	1.00000	28
Damp conditions persist for at least one month after flood recession	2.8929	.99403	28
Grounds are covered with algal growth after flood recession	3.5714	.87891	28
Police response to callouts unacceptably slow	2.9643	.99934	28
Fire service and rescue response to emergencies unacceptably slow	3.2500	1.00462	28
Children safety is big concern (relative to middle-aged, and elderly	4.5357	.50787	28
Criminality is more pronounced during flood periods (relative to non-flood period/dry season)	3.7500	.84437	28
Disaster Management to flooding inadequate	3.9286	1.11981	28
Civil defence/volunteer teams lack resources and leadership	3.5714	.69007	28

Item Statistics

	Mean	Std. Deviation	N
Smaller fleet of vehicles in circulation	3.7857	1.13389	28
Public transport grounded	2.5714	.83571	28
Transport fares increased	4.0000	.27217	28
Boats docked/at anchor	2.0714	.37796	28
Restricted access to key services centres (education, healthcare, commerce, banking, etc)	4.2143	.68622	28
Restricted access to place of economic activity/work	4.5000	.50918	28
Access to skilled workers/tradesmen more difficult	3.7500	.96705	28
Access to cooking fuel is a big problem	4.6071	.49735	28
Kinship, extended family and community assistance is less reliable than it was a decade ago	3.8214	.72283	28
Reliability of assistance from relatives, extended family and the community is low during floods	3.8214	.54796	28
Assistance from relatives, extended family and the community is mostly received after the worst effects of a flood are over.	3.6071	1.06595	28

Appendix 5: Pictures showing water outlets from the river during high tide that leads to flooding

Plate 2: Water outlet from river Gambia around Basse layout (the source of river flooding for the community of Basse layout)

Source: Author 2017

Plate 3: Water outlet from river Gambia around Basse ferry crossing point (This is the source of seasonal flooding severely affecting Kaba kama community).

Source: Author 2017

Plate 4: A developing water outlet from river Gambia next to the former Gambia Produce Marketing Board (GPMB) warehouse in Basse

Source: Author 2017