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Impacts of flood on the lives of school children in Basse, upper river region of the Gambia

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ABSTRACT

In recent years, The Gambia has witnessed a shift in rainfall patterns, marked by occurrence of annual flash floods in the low lying topographic communities such as Basse. This study investigates the impacts of flood on the lives of school children in Basse and identifies the adaptation measures employed to overcome the challenges. Proportional sampling was used to select the sample size

of 255 (138 from Kaba-Kama, 117 from Basse Layout communities) based on 95% confidence level and 5% margin of error. Although the school children were not directly affected by floods at the school level, a considerable number of them have been found to be severely affected by floods either at home or during their journey to/from school. Chi square test analysis showed that food supply and stationery loss varied significantly between the communities of Kaba Kama and Basse Layout, which may inadvertently cause low syllabus coverage and poor performance in examinations. The study revealed that although the civil society groups and school authorities were proactive in helping students to overcome the problems induced by floods, most of their efforts were derailed by other factors such as political interference, lack of resources and the prerequisite skills necessary to handle flood induced problems. The findings provide important insights that can contribute to public policy formulation and reforms relevant for climate change resilience in The Gambia.

Key Words: Climate change, School children, floods, resilience vulnerability.

1. INTRODUCTION

Globally, hundreds of millions of school going children are exposed to floods, which have medium or long-term implications (Pazzi *et al.,* 2016). Besides, they can cause significant societal and economic damages, inaddition to causing large number of fatalities worldwide. Statistics show that among the natural catastrophies, flooding has claimed more lives than any other single natural hazard (Rahman, 2014). The 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 (Ibrahim et al., 2017). According to Douglas (2008), due to the rapid growth of urban populations in Africa, flood impacts are likely to be aggravated. Tarhule (2005) and Tschakert *et al.* (2010), stressed 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 lack of scientific research into the increased effects of flooding within the dry lands of the Sahel. However, little empirical evidence 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 can be disrupted by their extended uses as shelters for evacuees and by laborious clean-up efforts needed after the floods (Cadag *et al.,* 2017).

The Gambia, with approximately 50% of the total land area being less than 20 m above sea level, and about 33% of the country below 10 m above mean sea level, is one of the most vulnerable countries in Africa to the adverse impacts of climate change. Any substantial global warming-induced sea level could immerse much of the country. About 20% of the country is currently flooded annually. In the eastern part of The Gambia, the commercial and residential areas of Basse Town (375 km away from the capital, Banjul), is frequently exposed to flooding as the River Gambia overflows its banks, during years of high river flows (BORE, 2015). In September of 2015 in particular, flooding in Basse, was reported as the worst in the town's history, which 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. Khatoon, et al. (2013), highlighted that each time a flood disaster occurs, it is reasonable to assume that some children who take a prolonged break from school, never return to class.

Kavegue and 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 (Jarju, 2009). But these were not river related floods instead they were due to poor drainage system after heavy torrential rains. Over the past years (1988, 1999, 2002, 2003, 2004, 2015 and 2016) riverine floods were observed in some parts of Central River Region (CRR) and in the Basse areas (Jarju, 2009). Flash floods in the urban areas such as in the Kombos 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. 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 350 km to Basse (Bore, 2015), flood impacts on children and adolescents of school-going age in particular is almost inexistent. How recurrent floods affects gross enrolment rate, school completion, gender parity in enrolment, and other social progress indicators. Specifically, the research assesses the effects of flood on the live support systems of school children. It also identifies problems faced by school-going children during floods in the study area and finally evaluates measures taken by

civil and school authorities and other organized groups to help school children overcome the related problems they encounter during floods.

2. MATERIALS AND METHODS

The study was conducted in Basse (13° 18' 35" N and longitudes 14° 12' 49" W), which is located in the Fulladu East District that covers 2,070 km^2 of Gambia's territory. 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 24ºC, while the minimum and maximum averages are 18ºC and 36ºC, respectively. The annual mean rainfall is pegged at 876 millimetres (Jaiteh and Sarr, 2011). This upriver settlement is 375 km 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 groups.

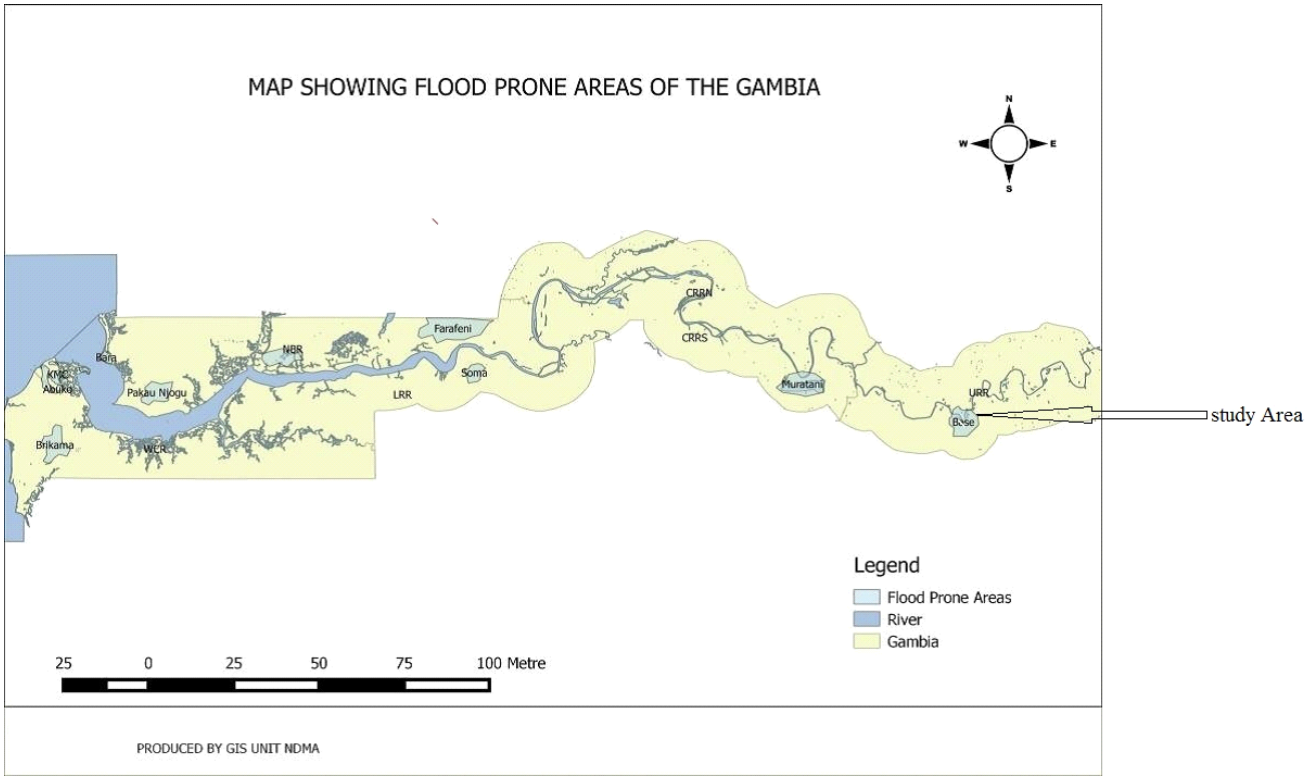

Figure 1 Map of The Gambia showing location of Basse. **Source:** NDMC (2015)

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. 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 characterized by hilly lands and terraces.

Three target groups were involved in the study - 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 (Strydom, Fouche and Delport, 2005). Parents were selected using average household size to determine the ratio 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 (Table 1).

Table 1 Sampled population breakdown from the two neighborhoods as they appear per school

School name	Population		Sample		Total
	Kaba kama	Basse-Layout	Kaba kama	Basse-Layout	Sample
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**

Note: SSS stands for senior secondary school, UBS means upper basic school and LBS refers to lower basic school.

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.

3. RESULTS AND DISCUSSION

The socio-demographic characteristics of school children interviewed are grouped into four themes as presented in Table 2. 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. In terms of gender, 50% of the respondents were female.

Table 2 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

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.

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. Interview results 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).

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.

A high percentage of respondents stated that roads to schools were 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, which 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 (Figure 2) below is an example showing the bad condition of the roads in Kaba-kama which most of the school children use to go to school.

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 lost 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 significant variation according to the Pearson Chi-Square test (Table 3). Kaba-kama again stands 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.

Figure 2 Road condition in Kaba kama taken 03/11/2017

Table 3 Distribution of school children's lost 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			

The school children's lost 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 looses 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.

School children in many parts of the globe, especially in Africa face numerous challenges including hazards such as floods, which expose them to diseases, loss of food and shelter. 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.

4. CONCLUSIONS

The study showed that school childen were not directly affected floods at the school level. On the contrary, some school children have been found to be severely affected by floods at the home level. Generally, access 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. Kaba-kama community is found to be more severely affected by floods than that of Basse-Layout. 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 respondents 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. Furthermore, floods in the study area have caused children to drop out of school just like cases in Pakistan, Sudan and Zimbabwe.

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.

Inclusion, the schools in Basse covered in this study are located outside flood-prone areas and this shields them from direct flood damage. School children are indirectly 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. Prolonged closure of schools could be both demotivating and stressful to children and some teachers contributing to poor performance and educational attainment of children. Flood relief efforts should be made more child-friendly to cater for specific needs of school children in aid packages handed over to recipient households;

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