

PERCEIVED VULNERABILITY TO FLOODING AMONG URBAN POOR DWELLERS IN ACCRA

***KORDIE, G.A.,¹ CODJOE, S.N.² AND DE GRAFT, A.A.²**

¹University Library, UDS, P. O. Box TL 1882, Tamale-Ghana

²Regional Institute of Population Studies, University of Ghana, Legon

*Corresponding author e-mail: godsadjei@gmail.com

Abstract

The study examines urban poor dwellers perceived vulnerability to flooding. Specifically, it looked at the causes of flooding, people most affected, effects of the floods and the coping mechanisms employed in the aftermath of the floods. Two flood prone communities in the Accra Metropolitan Assembly, Jamestown and Agbogbloshie were selected. A total of fifty-three participants comprising of a minimum of six people were engaged in eight focus group discussions in the two communities. Discussions with respondents were audio taped in their local languages and later transcribed into English language with assistance of an expert. The study revealed drainage problem floods and flash floods as the two major flood types in both communities, however the former was predominant in Agbogbloshie. Proactive and reactive measures were community adaptation and coping mechanisms to flooding. Children, women, elderly and the poor populations were the most vulnerable groups to flooding. The study recommends the construction of proper drainage facilities by authorities in Agbogbloshie, since they suffer most as a result of poor drainage systems.

Key Words: *Adaptation Mechanism, Drainage Systems, Flood Prone Communities, Flood Victims, Vulnerability*

Introduction

Climate change is any change in climate over a long time, whether due to natural variability or as a result of human activities (IPCC, 2007). According to Olorunfemi (2011), flooding is one of the most hazardous, frequent and widespread of all natural disasters throughout the world.

Climate change increases the vulnerability of the urban poor throughout Africa (Action Aid International, 2006) especially changes in

rainfall due to its exposure to severe weather events and its over reliance on natural resources (O'Brien *et al.*, 2003). Jonkman (2005) posited that, every year floods cause enormous damage all over the world, and in the last decade of the twentieth century, about hundred thousand people were killed as a result of floods and about 1.4 billion people were severely affected. Over ninety percent of all deaths from natural disasters are estimated to be water related and ninety-nine percent of these deaths during 1975-

2001 amounted to over two hundred and fifty thousand people who are from low income countries (Crichton, 2008).

Sub-Saharan Africa is deemed to be most vulnerable to climate variability including flooding in the world (Armah *et al.*, 2010). According to the British Broadcasting Corporation (BBC, 2007), the then United States spokeswoman, Byrs stated that in 2007 about five hundred thousand (500,000) people were affected by floods in twelve countries in Africa. Some of the poorest countries in sub Saharan Africa for example Mali, Niger and Burkina Faso were severely affected.

A report from National Disaster Management Organization (NADMO, 2010) suggests that although Ghana is vulnerable to certain disasters, flooding has become the major disaster the country has suffered in recent years especially in its urban areas and more seriously affected is Accra, the country's capital. Flooding is second to epidemics that have claimed a lot of human lives in the country. Between 1968 and 2011, floods have killed about three hundred people and affected about 3.81 million people (Okyere *et al.*, 2012) and this may even become a greater problem with a rise in sea levels (Rain *et al.*, 2011).

Populations in low lying coastal regions are at higher risk of being affected by rise in sea levels, especially in countries where economic conditions do not allow construction of sea defenses (Haines *et al.*, 2006). Meanwhile Chan and Parker (1996) stated that development is said to be progressively threatened and weakened with severe disasters such as flooding. Okyere *et al.* (2012) also asserts that recurrent flooding can thwart the aim of a country to

achieve its Millennium Development Goals (MDGs).

The aftermath of these floods often result in loss of human lives, physical and psychological injuries, displacing population, causing financial loss to both the victim and the larger economy. It also causes epidemics through the spread of waste flood water and the accumulation of water creating conducive breeding grounds for mosquitoes and the blockage of drainage channels (Feng *et al.*, 2007; Adedeji *et al.*, 2012), which is already a critical health and environmental issue particularly in poor areas (Rain *et al.*, 2011).

Available literature has found urban poor dwellers who live in poor infrastructure and housing conditions to be more vulnerable to flooding as compared to other urban dwellers (Shardul, 2005; Okyere *et al.*, 2012). Adanu (2004) affirms that in Ghana this problem can be attributed to the lack of accessible roads to homes and shops in poor urban areas. The researcher stated that these roads are usually occupied with buildings and kiosks. Olorunfemi and Raheem (2007) found that these urban poor dwellers are faced with serious challenges in moving to less dangerous sites, due to their low income and lack of financial reserves. This constrains the urban poor dwellers to choose well-located, safer sites coupled with their want to be located closer to income-earning opportunities.

Flooding is a community level event rather than an individual affair because its impact is not limited to an individual in a community. However, the severity of flood disaster varies from person to person depending on the magnitude of the flood and their social vulnerability to flooding (Wong and Zhao, 2000).

Although at times there are warning signs about flooding, most flooding strikes quite suddenly which severely affect its victims. Floods cause injury, result in great physical destruction in the natural and built environments and sometimes death (Kaniasty and Norris, 2004). It also evokes a number of other stressors that challenge victims for a very long time and inflicts a long lasting trauma on them.

Although some studies have been conducted on the perennial flooding in Ghana (Aboagye, 2012; Arthur and Arthur, 2011), there is still paucity of information on how urban poor dwellers perceive their vulnerability to flooding. It is therefore necessary to undertake this study, because the findings will go a long way to inform policy makers on what policies to formulate to assist vulnerable urban dwellers. The aim of this study is therefore to examine urban poor dwellers perceived vulnerability to flooding. To achieve this aim, the study specifically looked at the following; to identify people's perceived causes of flooding in the study area; to identify how persons affected by flooding vary depending on their demographic and socio-economic factors and the coping mechanisms used as cushioning in the aftermath of the floods.

Methodology

Study Area

Agbogbloshie and James Town are two urban poor communities in the Accra Metropolitan Assembly (Figure 1). James Town is an old Ga town and one of the earliest towns in Accra. Both communities are located in Central Accra in the Ashiedu Keteke District under the Accra Metropolitan Assembly (A.M.A). Although Agbogbloshie and James Town

are varied in their ethnic makeup, there is great similarity in their socioeconomic structure.

Agbogbloshie covers a land area of about four acres and has a human population of about nine thousand. It is a multi-ethnic community made up of economic migrants from the various parts of Ghana (Ghana Statistical Service, 2012). The community is embedded in a major market area where most of the foodstuffs from the surrounding rural areas are transported and redistributed to other satellite markets in Accra. Majority of its inhabitants are engaged in trading activities ranging from food to non-food items with others working as artisans. Due to increased housing demand, land and construction cost, most of the houses in the community are mobile (wooden-walled structures/ kiosk) with closed unplanned structures which have little or no drainage systems. This pose a lot of sanitation problems coupled with the fact that there is no health facility in the community.

James Town on the other hand is purely an indigenous Ga community with its inhabitants mainly Ga-Dangmes, although there are traces of some minor ethnic groups such as Akan and Hausa. Ga language is therefore the major mode of communication in this community. James Town has a population of over seventeen thousand people with compounds usually consisting of six to twenty people (Ghana Statistical Service, 2012). James Town unlike Agbogbloshie has a community clinic and a few pharmacies. It is a coastal community where fishing and fish processing are the predominant economic activities of the people. While the men mainly engage in fishing, some of the women process the fish and others serve as fishmongers.

Residential structures in this area are mostly cement-walled with few places designated for recreational activities unlike that of Agbogbloshie. However,

within the centre of the community is a place for butchering livestock which creates unpleasant smell for the inhabitants.

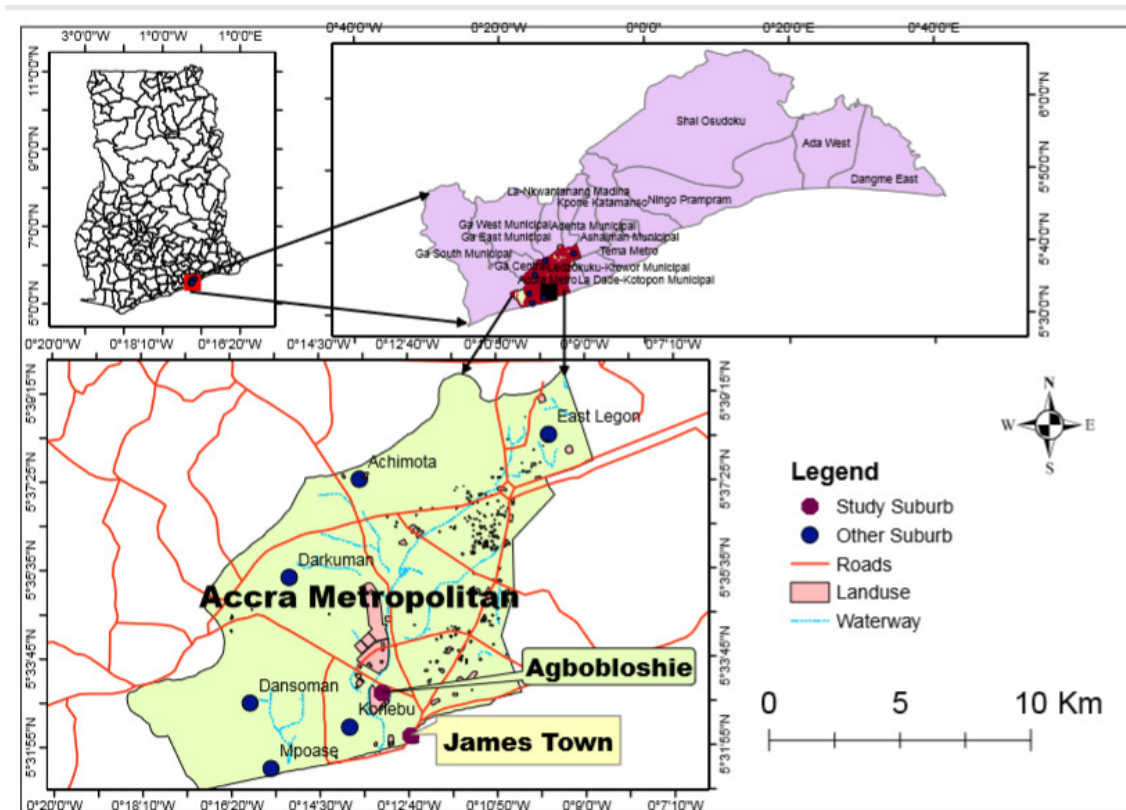


Figure 1: Map of study area

Materials and Methods

Observation

The researcher's personal observation in each of the communities was recorded during the research period. This helped in gaining a first-hand information, exploring unusual aspects such as issues on sanitation, economic activities and community cohesion, as well as understanding in practical sense some of the causes of flooding in these communities. This observation gave an in-depth understanding and helped to either confirm or probe further some responses given by some respondents during the focus group discussions.

Focus Group Discussion

This study is purely a qualitative study that makes use of focus group discussions with community members with the purpose of understanding their perceptions of vulnerability to flooding. Focus group was used in soliciting for information due to the method's unique nature in addressing community based problems. This method is based on principles of community involvement in addressing circumstances and challenges that are important to members of the community, thus, reflecting how social beings in a community think about flooding. According to Wong and Zhao

(2000) although the impact of flooding varies from person to person depending on some factors such as social vulnerability to flooding, it is seen as a community level event rather than an individual affair since its impact is not limited to an individual in the community. This data collection method was also chosen because, it is both rigid and flexible thus giving the researcher the opportunity to design questions that are semi-structured in nature that allows him/her control over the line of questioning while at the same time making room for the respondents to narrate or elaborate on them.

Segmentation Approach

Each community was sub-divided into two, flood prone area and non-flood prone area. This was done to help capture the vulnerable to flooding and non-vulnerable to flooding groups in each of the communities. This categorization was informed by the author's observation during the reconnaissance visit and informal communication among some local gate-keepers in the communities who mentioned that some particular areas flood anytime there is a downpour. In Agbogloboshie, all residents around the area called by residents as 31st December, as well as residents around the Presbyterian Church were classified as one group that is vulnerable to flooding. All the other parts of the community were classified as non-vulnerable group. In James Town, available literature suggests that some residents are vulnerable to flooding as a result of the Korle Lagoon (Sam Jr., 2009). As a result, all residents in James Town towards the Korle Lagoon were classified as vulnerable to flooding and others far from the lagoon classified as non-vulnerable to flooding.

In each community, a purposive sampling technique was used in selecting participants from the flood-prone areas to form the focus groups. The justification behind this sampling approach was to enable the researcher to get the required people who will give meaningful contribution with regard to the topic. Members in the non-flood prone areas were randomly selected since they form the majority of the population. In each of the flood prone and non-flood prone areas, two focus group discussions were organized, namely, male group and female group making four groupings in each community and a total of eight focus groups in the two communities.

This segregation was due to the fact that, a homogeneous group brings less intimidation and therefore enables individual participants in a group to fully engage in the discussion.

Sample Size

Each focus group comprised a total number ranging from six to nine individuals, making the total sample size of fifty-three participants for all the eight focus groups conducted. Each of the eight focus group discussions that was audio-taped in the respondents' local languages (Ga and Akan) was later transcribed into English language by an expert.

Data Analysis

Developing a Coding Frame

The transcripts were first examined, organized and categorized into various codes. A coding frequency was then obtained by bringing together all basic themes and the number of times each of them appeared in the discussion. The coding frame was then conceived theoretically and guided by basic themes identified in the transcripts. Attride-Stirling's (2001) thematic network

approach was used as a guide in developing both deductive and inductive codes that explore the understanding of the issues. This thematic network approach is a qualitative research analytical tool that provides a clear series of steps for carrying out thematic analysis of a qualitative material. Attride-Stirling's (2001) thematic network represent a web-like illustration that gives a pictorial view of how the basic themes come together to represent an organizing theme and by uniting several organizing themes bring into being the core of the thematic network called the global theme. A thematic analysis was

used to analyze the data. Pseudonym names shielding participant's identity have been used in the analyses.

Results and Discussions

Figure 2 shows a pictorial representation of the primary objective of the study, aimed at examining urban poor dwellers perceived vulnerability to flooding. Under the global theme perceived vulnerability to flooding, four organizing themes emerged. These are perceived causes of flooding, persons most affected by flooding, effects of flooding and adaptation mechanisms employed by flood victims.

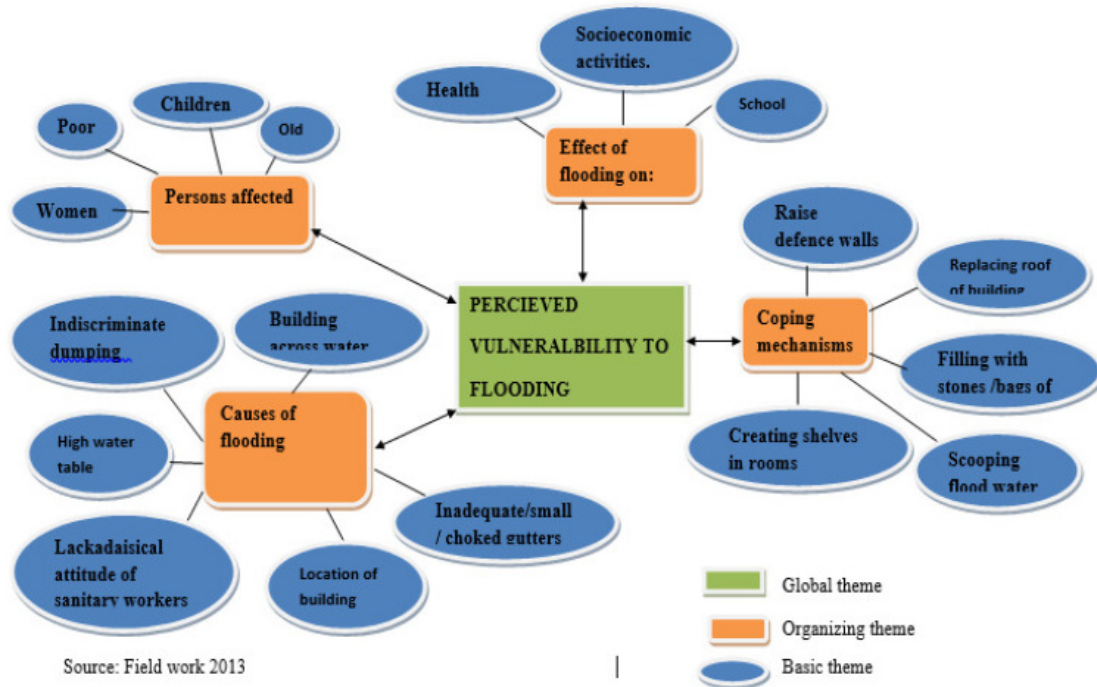


Figure 2: perceived vulnerability to flooding: A thematic network

Perceptions of Vulnerability to Flooding

Flooding was a major environmental challenge according to the respondents. The type of flooding that occurred in the research communities can be likened to two of the three types of flooding as

classified by Jonkman (2005). These are the drainage-problem floods and flash floods. There were seven main causes of flooding as perceived by respondents and indicated in Fig. 2. These were further grouped into three; namely, individual

cause, structural cause and natural causes of flooding.

Individual Causes of Flooding: indiscriminate dumping of refuse was the highest recorded cause of flooding in the research communities. It transcends community boundaries as well as gender differentials. Respondents attached greater importance to it and attested to the fact, this attitude of indiscriminately dumping refuse often results in the few available gutters being choked up which subsequently leads to flooding. They elaborated their communities are often left untidy whenever it rains and piles of rubbish are carried away by flood water. This goes to buttress the biological aspect of the Biopsychosocial cost of ecosystem disturbance on which the study was founded (Tschakert and Tutu 2010). A plausible reason for indiscriminately dumping refuse can be linked to high cost of disposing waste in the study area.

In Agbogbloshie it was observed that most waste generated by the market people is often left within the community while the people in James Town perceive the sea to be a drain of waste. They therefore throw refuse anyhow with the hope that when it rains, it will be carried away by the rain water into the sea. This finding was in conformity with the report by the Institute of Local Government Studies (ILGS) and International Water Management Institute (ILGS and IWMI, 2012) which found some residents in some urban poor communities in Accra disposing refuse haphazardly with the aim of being carried away by flood water. ***'There is someone who will take refuse from her house and come and place it at our place, go and look they have come and park some there'*** (Eno, James Town Vulnerable Female, 2013).

Building across water courses was another cause of flooding in the research communities. The respondents complained that most people build in unauthorized places which results to flooding. This was in agreement to Karley (2009) who found that encroaching on water courses was one of the most significant causes of flooding in Ghana.

The way people have built their houses here, because certain places are for water courses but people rather build there so the water doesn't get anywhere to run off' (Maame Yaa, Agbogbloshie Vulnerable female, 2013).

This practice was common in Agbogbloshie than in James Town per the researcher's observation which could perhaps be due to the proximity of the community to the market, most people will want to live close to the market and thereby put up structures without any official permit. It also came up from the discussion that, the cost of rent was considerably cheaper in Agbogbloshie as compared to most areas in Accra which could compel most people especially those who are into buying and selling to live there, thereby increasing the tendency of some people to build inappropriately. Olorunfemi and Raheem (2007) assert that poor urban dwellers have low income which constrains them from relocating to safer sites.

Location of building was the last individual cause of flooding and relevant to female groups especially respondents in James Town. They lamented that due to the location in which they find themselves within the community, they are on the disadvantageous side of experiencing flooding. In Tschakert *et al.* (2009), the conceptual framework on which this study is drawn, vulnerability

to flooding was described as the likelihood of a system to experience flooding and that system's livelihood characteristics such as its location and housing structures. It therefore suggests that this has something to do with the topography of the area. Monica, a female respondent in James Town bewailed: ***'see when it rains since we are at a lower lying part of James Town, the water comes to our house...'***

Structural Causes of Flooding: structural causes of flooding according to the respondents were, high cost for disposing waste in the community, inadequate and small gutters, as well as the lackadaisical attitude of some sanitary workers. Majority of the respondents did not have private toilet facilities in their homes and therefore access the general community toilet facility for a fee. However, with a recent increase in the fees coupled with their low income status, they were left with no option than to defecate in their backyards which left the entire community untidy and unhygienic as observed by the researcher. According to them they had to pay large sums of money before allowed to dispose rubbish and therefore dump it somewhere within the community in times when they do not have the money.

Inadequate and or small gutter was a major problem to the people of Agbogbloshie than those in James Town. The slum- like nature of Agbogbloshie with its attending poor community planning makes this community lack the necessary gutters needed for run-off. In addition to the lack of gutters, the few small gutters as termed by the respondents' 'manmade' were often choked. Inadequate drainage system according to Dabara (2012) was a major cause of flooding in Gombe in Nigeria.

'At least there should be a gutter so when it rains, it does not enter people's rooms and the open gutters also make this place flood' (Amoako, Agbogbloshie Vulnerable male, 2013).

In James Town, however, although they suffer indiscriminate dumping, they have properly constructed drainage facilities that enhance run-off, and therefore did not attach much concern.

Lackadaisical attitude of sanitary workers was pertinent to female groups in both communities perhaps due to their role as housekeepers. Respondents expressed the view that sanitary workers were not able to render unto them better services and therefore leave their communities dirty. According to them, while there are inspecting officers who were supposed to inspect the work done by these sanitary workers, they do not see any inspecting officer in their communities. This practice they believe might have caused the sanitary workers not to render quality services to them.

Ashorkor, had this to say ***'...the government has employed people to clean the gutters and inspectors/supervisors who should check these people. Because there's no inspection the person who clean our gutter will not come, meanwhile at the end of the month he will go and collect his money...'***

Natural Causes of Flooding: one theme emerged under the natural cause of flooding and was described by respondents as high water table. They stated that as a result of natural holes in the ground, additional water comes from these holes which make flood water stays longer in their compounds even after scooping. This finding according to Chan and Parker (1996) are factors that exacerbate the occurrence of flooding.

Here is a sample quote from Abbey, a male respondent in James Town: ***'...the ground here has holes in it so it makes the water stay here for a long time when it rains'***.

Persons Most Affected by Floods

The perceptions of impact of hazardous events are usually not distributed equally among different groups of individuals in a community. The study revealed that in the aftermath of flooding some people were greatly impacted than others even in the same community. Four groups of persons were identified: children, women, older people and the poor.

Children were deemed to be most affected according to respondents from both communities. According to them, children had little knowledge in differentiating between good and bad. The problem is even worsened when the incident of the flooding occurred at night, because they had to wake these children up to save their lives, since the flood water at times reaches an adult's waist level. Another way by which flooding affects children is that they are often confined indoors and are then cut off from any other social activities for the fear of being drowned. The health repercussions of flooding are also mostly severe among children than any other group since they react to adverse health effects such as rashes and cholera during this period.

Monica, a female respondent vulnerable to flooding in Agbobjoshie explained: ***'... Maybe the child will be feeling cold and will like to sleep but you have to scoop and mop the water before he gets somewhere to sleep...'***

Women were the other group of people deemed most vulnerable to flooding. This is probably due to their socio-cultural

setting, where females bear the greater responsibility of taking care of the children. They are therefore mostly found in the house while the men embark on income generating activities outside the home. This finding contradicts what available literature suggests that, gender is not an important factor that influences a person's vulnerability to flooding. However, is in line with Regyl *et al.* (2006), who asserts that females are more vulnerable due to their responsibility of taking care of the children and the elderly who require help and supervision. Another plausible reason could be that, because of socio-cultural beliefs, women are sometimes regarded as the weaker vessels, and normally project their suffering while men are expected to be strong and therefore were not able to project their suffering as women did.

'.....I will say it worries we the women most because maybe you are having a child whom you have to carry in order to avoid the flood when it is raining. At times the children will be say three or four and your husband is not around how can you carry all of them.....' (Akosua Tuntum, Agbobjoshie Vulnerable female, 2013).

Older people were described by respondents as weak as a result of decline in their physical health which Shaw *et al.* (2005) attested that the elderly demand special care and attention because they are unable to respond on their own to the impacts of flooding.

'.....The old ladies their bodies are too weak because of their age and therefore need somebody to help them.....'

The last group of people severely affected during flooding were the poor. It is interesting to state that respondents deemed themselves as the poor people who are faced with this challenge of

living in the flood prone areas with no hope of moving out. They emphasized that no rich man will be willing to live in the kind of environment they find themselves. It agrees with Regyl *et al.* (2006) who concluded that poor people are unable to afford less flood prone areas, and they live in poorly built structures due to their lack of resources.

‘.....No rich person will live at the bank of a gutter; it’s we the poor people who will live here...’

Effects of Flooding in the Communities

Four effects of flooding were identified from the discussion with respondents. These encompassed: effects on health, effects on socioeconomic activities, effects on school and effects on psychological health.

The health implications of flooding are closely linked to the sanitation of the community. According to the respondents, this negative health effect was as a result of the filth including fecal matter carried to their homes by the flood water.

There were both immediate and long term effects. Negative health effects such as skin rashes, cholera and physical injuries were some of the immediate effects of flooding. The long term effect had more to do with the breeding of mosquitoes through the collection of stagnant water which subsequently leads to the spread of malaria.

‘.....What I’m afraid of in Agbogbloshie is cholera outbreak and diarrhea because it has started raining and people are putting toilet in the gutters which mixes with the rain water on the field and children go out to play and may fall sick.....’

Electric shock was another health effect expressed by respondents. They mentioned that the whole vicinity is

electrified whenever there is a down pour due to an underground wiring which restrict their movement in the community. This electric shock theme was new to the literature, which should indeed be included under the broad health effect of flooding.

‘.....The water floods here such that if you are walking you cannot move your leg in the water; there is electric in the ground, it can shock you....’

The Biopsychosocial cost of ecosystem disturbance theory stated that flooding has an influence on the social aspect of the well-being (Tschakert, 2007). The effect of flooding on socioeconomic activities was mostly felt by the people of Agbogbloshie than those in James Town. This is because the inhabitants of Agbogbloshie are mostly traders, and their livelihoods centered on buying and selling.

Flooding deprives them from embarking on their livelihood ventures because they spend all their time scooping flood water thereby bringing business activities almost to a halt during these periods. Also, due to the dilapidated state of their road and the nature of their road network, coupled with the flood water, they are cut off from any transactions since no vehicle will be willing to enter the community.

Flooding had serious repercussion on schooling activities especially for the people in Agbogbloshie. On the contrary, respondents in James Town could not see any link between flooding and schooling activities. Respondents in Agbogbloshie mentioned that during heavy rains, school children were not able to go to school for fear of being drowned or carried away by the flood water since children sometimes have to cross bridges some of which are

wooden which becomes death traps during these period.

Respondents acknowledged that education is now the key to financial breakthrough, meanwhile, they do not have a single school in Agboglobshie, and had to take their children to other neighboring communities.

'... if you look at Agboglobshie the people here are many, but there is no single school here and all the children here are going to school far distances from here....' (Konadu, Agboglobshie, Vulnerable Female).

Turning to the psychological effect of flooding, it was observed from the study that some individuals were often traumatized in the aftermath of the flooding event thereby impacting negatively on their psychological well-being.

Respondents whose properties were either destroyed or carried away by the flood encounter stress which often leads to feelings of discomfort, depression and anxiety whenever they perceive to expecting the rains.

'.....so whenever the weather becomes cloudy then we are crying and praying that it should not rain because the water will not get anywhere to pass but enter our rooms.....' (Grace, Agboglobshie, Vulnerable Female).

Community Adaptation and Coping Mechanism to Flooding

Adaptation and coping mechanisms are various ways which people employ to help them reduce and sometimes withstand the negative impact of flooding. Some mechanisms employed at the individual, household and community levels were: creating shelves in rooms, replacing the roof of their building, raising defense walls in front of their rooms, filling their compounds with

stones and bags of sand, scooping the flood water, relocating to live with friends and drawing on one's religious faith. From the range of mechanisms employed, two main groupings were derived, namely; proactive measures and reactive measures.

Proactive Measures

Proactive measures were measures respondents put in place in anticipation of future floods. This gives them some form of assurance that in the event of flooding, their lives and properties were safe. The creation of shelves in rooms was mostly an individual adaptation measure employed by female flood victims to ensure that valuable items and personal belongings were kept on higher elevations to avoid damage.

Replacement of roof was another proactive measure adopted by flood victims. Although this adaptation measure seems to be more physically demanding, it was employed by vulnerable female respondents. This could probably be due to the fact that most household heads within the community who are vulnerable to flooding were females and therefore had to take the initiative of replacing the roof.

The last proactive measure was by raising defense walls in front of rooms to prevent the flood water from entering their rooms. This practice unlike the other two proactive measures transcended gender differentials. Shaw et al. (2005) indicate that some households adopt the construction of elevations and or shield their houses with water barriers to block the water from entering their rooms.

'Our door steps you can see that we have done a little wall there, if you don't use anything to block the water, it will enter into the room'

Reactive Measures

Reactive measures according to the respondents assist in the recovery process in the aftermath of the floods.

Scooping of flood water was the most common reactive measure adopted in the two communities. This could be attributed to the less financial cost involved and the lesser skill attached to it, although it was both time consuming and tedious because they will have to bring all their belongings out from their rooms, scoop and mop the rooms, wait while the room dries and then pack their things back to the room. This activity however result in quarrelling among neighbors since there is always a disagreement as to where to throw the collected water.

Placement of stones and bags of sand was another reactive measure adopted by members of both communities. This practice was employed both at the household and community levels. These stones provided access through the flooded areas and the bags of sand also prevents the flood water from entering their rooms. This practice was also reported among residents in Mataheko and Old Fadama, suburbs of Accra as coping mechanisms (ILGS and IWMI, 2012).

Relocating to live with friends was another recovery measure, although not effective because according to the respondents they were not able to live for long before they overstay their welcome. Arthur and Arthur (2011) also found that flood victims in Ghana usually relocate to stay with family members but return when the floods subside.

Fosuah shares her experience: *...So there is a brother here called 'Four Play' who came to carry all the children to his place....'*

Finally, flood victims during this period resorted on their religious text and faith in God as a way of coping with this disaster. The finding confirms that of Chan and Parker (1996) in Malaysia, which suggests that poor households especially Muslim households resort more to prayer as a coping mechanism. *'...As you know, the Bible even says "if you have life you have all things...'*

Conclusion

This study reveals that two types of flooding occur in Agbogbloshie and James Town communities. Children, women, older people and the poor were greatly impacted in the aftermath of flooding. Flooding had a severe impact on the lives of these victims ranging from their social and economic lives to their psychological health.

Both proactive and reactive measures were employed as adaptation mechanisms during the flood incidence. Scooping of flood water was the major adaptation mechanism employed by flood victims in both communities.

References

- Aboagye, D. (2012). The Political Ecology of Environmental Hazards in Accra. *Ghana Journal of Environment and Earth Science*, 2(10): 57-172.
- Actionaid. (2006). Climate Change, Urban Flooding and the Rights of the Urban Poor in Africa: *Key Findings from Six African Cities*, pp. 1-8.
- Adanu, S.K. (2004). The Need for Changes in Urban Planning, Case Study of Accra, Capital City of Ghana. *40th ISoCaRP Congress*, pp. 1-10.

- Adedeji, H.O., Odufuwa, O.B. and Adebayo, H.O. (2012). Building Capabilities for Flood Disaster and Hazard Preparedness and Risk Reduction in Nigeria: Need for Spatial Planning and Land Management. *Journal of Sustainable Development in Africa*, 14(1): 45-58.
- Armah, A. F., Yawson, O.D., Yengoh, T.G., Odoi, O.J. and Afrifa, A.K.E. (2010). Impact of Floods on Livelihoods and Vulnerability of Natural Resource Dependent Communities in Northern Ghana. *Water*, 2: 120-139.
- Arthur, J.L. and Arthur, I.A.Y. (2011). Movement under Environmental Disasters: The Case of Flooding and Bushfires for Selected Periods in Ghana. *Center on Migration, Citizenship and Development*. Bielefeld, 97: 1-20.
- Attride-Stirling, J. (2001). Thematic Networks: An Analytic Tool for Qualitative Research. *Commission for Health Improvement*, Pp. 385-405.
- British Broadcasting Corporation (BBC) Evidence (2007). *Rain Threatens Flood- Hit Africa*. (Online). Available at: <http://news.bbc.co.uk/2/hi/Africa/default.stm>. Accessed. 12th February, 2013, 16:00GMT.
- Chan, W.N. and Parker, J.D. (1996). Response to Dynamic Flood Hazard Factors in Peninsular Malaysia. *The Geographical Journal*, 162(3), pp. 313-325.
- Crichton, D. (2008). Role of Insurance in Reducing Floods Risk. The International Association for the Study of Insurance Economics. *Geneva papers*, 33: 117-132.
- Feng, S., Tan, H., Abuaku, B., Wen, S., Liu, A., Zhou, J., Li, S., Yang, T., Zhang, Y., Li, X. and Li, G. (2007). Social Support and Posttraumatic Stress Disorder Among Flood Victims in Hunan, China. *Ann Epidemiol*, 17(10): 827-833.
- Ghana Statistical Service (2012). 2010 Population and Housing Census. Summary Report on Final Results. (Online). Available at: http://www.statsghana.gov.gh/docfiles/2010phc/Census2010_Summary_report_of_final_results.pdf Accessed: 20th March, 2018.
- Haines, A., Kovats, R.S., Campbell-Lendrum, D. and Corvalan, C. (2006). Climate Change and Human Health: Impacts, Vulnerability, and Mitigation. *Herben Lecture Lancet*, 367: 2101- 2109.
- Intergovernmental Panel on Climate Change IPCC (2007b): Summary for Policymakers. In: *Climate Change 2007: Impacts Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Parry, M.L., Caziani, F.O., Palutikof, J.P., Van der Linden, J.P. and Hanson, E.C, Eds., Cambridge University Press, Cambridge, UK, pp. 7-22.
- Institute of Local Government Studies (ILGS) and International Water Management Institute (IWMI) (2012). *Community Adaptation to Flood Risk and Vulnerability, Final Report*. Pp. 1-95.
- Jonkman, S.N. (2005). Global Perspectives on Loss of Human Life Caused by Floods. *Natural Hazards* 34(2): 151-175. (Online). Available

- at:<<http://link.springer.com/article/10.1007%2Fs11069-004-8891-3>>
Accessed: 9th April, 2013.
- Kaniasty, K. and Norris, F.H. (2004). Social Support in the Aftermath of Disasters, Catastrophes, and Act of Terrorism: Altruistic, Overwhelmed, Uncertain, Antagonistic, and Patriotic Communities. Bioterrorism: *Psychological and Public Health Interventions*, ed. R. J. Ursano, A. E. Norwood and C. S. Fullerton. Cambridge University Press, pp. 200-229.
- National Disaster Management Organization (NADMO), (2010). Building a Culture of Disaster Prevention. Available at : <[http://www.nadmo.gov.gh/Articles/THE%20OFFICIAL%20NEWSLETTER%20OF%20THE%20NATIONAL%20DISASTER%20MANAGEMENT%20ORGANISATION%20\(NADMO\)%20NO.%201%20VOLUME%204%20JANUARY%20-%20JUNE%202010.pdf](http://www.nadmo.gov.gh/Articles/THE%20OFFICIAL%20NEWSLETTER%20OF%20THE%20NATIONAL%20DISASTER%20MANAGEMENT%20ORGANISATION%20(NADMO)%20NO.%201%20VOLUME%204%20JANUARY%20-%20JUNE%202010.pdf)>. Accessed 20th February, 2013.
- O' Brien, K., Sygna, L., and Huagen, E.J. (2003). Vulnerable or Resilient? A Multi-Scale Assessment of Climate Impacts and Vulnerability in Norway. *Climate Change*. Pp. 1-33.
- Okyere, Y.C., Yacouba, Y. and Gilgenbach, D. (2012). The Problem of Annual Occurrences of Floods in Accra: An Integration of Hydrological, Economic and Political Perspectives. *Interdisciplinary Term Paper Zef Doctoral Studies Program*, pp. 1-50.
- Olorunfemi, F.B. and Raheem, U.A. (2007). "Urban Development and Environmental Implications: The Challenge of Urban Sustainability in Nigeria". *Ibadan Journal of the Social Sciences*, 6(1): 69-78.
- Olorunfemi, F.B. (2011). Managing Flood Disasters Under a Changing Climate: Lessons from Nigeria and South Africa. *Niser Research Seminar Series, Niser, Ibadan*, (1): 1-44.
- Rain, D., Engstrom, R., Ludlow, C. and Antos, S. (2011). Accra Ghana: A City Vulnerable to Flooding and Drought-Induced Migration. Case Study Prepared for the Flooding and Drought-Induced Migration. *Global Report on Human Settlements*, pp. 1-21.
- Rygel, L., Sullivan, O.D. and Yarnal, B. (2006). A Method for Constructing a Social Vulnerability Index: An Application to Hurricane Storm Surges in a Developed Country. Mitigation and Adaptation Strategies for Global Change 11: 741-764. Available at: <http://www.cara.psu.edu/about/publications/Rygel_et_al_MASGC.pdf>. Accessed: 9th April, 2013.
- Sam Jr., A.P. (2009). Focus: Flooding in Accra Research Report. [(online) Last updated 22:33 CET)]. Available at: <<http://www.modernghana.com/news/223780/1/flooding-in-accra-research-report.html>>. Accessed: 26th March, 2013.
- Shaw, R. (2006). Critical Issues of Community Based Flood Mitigation: Examples from Bangladesh and Vietnam, "Flood Disaster Risk Reduction in Asia" *Journal of Science and Culture Special Issue On Flood Disaster Risk Reduction in Asia*, 72(1-2): 1-17.

- Shaw, D., Huang, H.H., Ho, C.M. and Lin S. (2005) Modeling Flood Loss and Risk Perception. The Case of Typhoon Nari in Taipei. Socio-Economic System Division, National Science and Technology Center for Disaster Reduction, Taipei, pp. 1-20.
- Shardul, A. (ed.) (2005). *Bridge Over Troubled Waters: Linking Climate Change and Development. Organization for Economic Cooperation and Development*. Paris: OECD Publishing, pp. 1-157.
- Tschakert, P. and Tutu. R. (2010). Solastalgia: Environmentally-Induced Distress and Migration due to Climate Change among Africa's Poor. In T. Afifi and J. Jäger (Eds.) *Environment, Forced Migration and Social Vulnerability*. International Organisation for Migration. *Springer*, pp. 57-72.
- Tschakert, P. (2007). Views from the Vulnerable: Perceptions on Climatic and other Stressors in the Sahel. *Global Environmental Change*, 17: 381-396.
- Wong, K.K. and Zhao, X. (2000). Living with Floods: Victims' Perceptions in Beijiang, Guangdong, China. *Area*, 33(2): 190-201.