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Urban Flooding in Kenya from A Psychosocial Perspective

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Abstract

There are legislative and engineering interventions coupled with increased community participation to mitigate urban flooding. However, there is an observed increase in flood events and their impact in these environments globally; and participation by individual home and property owners in community-driven initiatives to mitigate flooding in urban and peri-urban areas is reportedly low. The major objective of this study was to provide an understanding of urban flooding in Kenya from a psycho-social perspective. The specific objectives were: to establish a basis for a study associating the onset of flooding with environmental attitude and behaviour; to set ground for an investigation relating the effect of flooding on households to environmental attitude and behaviour; provide a background for analysis to correlate the level of humanitarian support during flooding with environmental attitude and behaviour; provide a basis for evaluation of possible attitude and behavioural change approaches to enhance urban flood disaster interventions; and to develop a conceptual framework the study of urban flooding in Kenya from an environmental attitude and behavioural perspective. This was a desk-top survey that involved a review of the literature covering urban flooding onset triggers, effects, and interventions; human attitudes and behaviour; environmental abuse, degradation, and conservation; as well as urban populations' livelihood practices. The study concludes that there exist gaps that provide an opportunity for investigation of urban flooding in Kenya from a psycho-social perspective.

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1. Introduction

Flooding is one of the major natural disasters that disrupt the prosperity, safety, and amenity of people in both rural and urban areas. Encompassing a flow of water over areas that are habitually dry, flooding is widely reported as the most endangering source of disaster risk (Satterthwaite, 2007). Numerous scholars now focus on urban flooding as an issue of increasing concern which may shape the destinies of whole cities or substantially change their face (Jha et al., 2011).

The unusually widespread and severe flood events reported between 2010 and 2012 reveal a marked increase in urban flood events and their impact globally arising from the two themes of urbanization and climate change (Jha, Bloch & Lamond, 2012). In urbanization, poorly planned urban settlements make human populations more vulnerable to floods; while due to climate change, global warming and extreme weather events are getting more frequent (Jha et al., 2011). With increased urbanization, cities like London, New York, Washington DC, Johannesburg, Cairo and Nairobi, to just but mention a few, are reported to expand their municipal boundaries to become larger metropolitan regions (GoK, 2008). Large populations acquire land and settle in the peripheral settlements, but still feel they are in the city (Douglas et al., 2008). These areas experience rapid demographic and socio-economic transformation accompanied by environmental challenges (Eakin, Lerner & Murtinho, 2010; UN-HABITAT, 2006).

As the cities and towns grow in sizes, flooding is reported to be a serious and growing phenomenon affecting both the developed and developing countries where they are getting more frequent, complex and multifaceted (Jha et al., 2012; UNISDR, 2005; UN Habitat, 2011). It is also noted that as the peri-urban settlement activities increase, there is a marked increase in flood events with the engineering and legislative approaches to managing floods in these environments observed to lose effectiveness (Action Aid, 2006, Eakin, Lerner & Murtinho, 2010; Smith, 2009; Stern, 2007).

In spite of the enormity of the problem and the low adaptive capacities of victims of peri-urban flood events in Kenya, and Africa as a whole, response to flooding in these environments has mainly been individual or household-based and a communal issue through local community-driven approaches where adequate commitment and participation by homeowners is imperative (Douglas et al., 2008; Victoria, 2005). In informal and peri-urban settlements, residents develop their own means to cope with and respond to flooding by mobilizing logistics for operations such as rescue and humanitarian support over the emergency period (World Bank, 2003). Residents also rely on social capital such as reciprocal support among neighbours and family members to cope with flooding (Alam et al., 2007).

Social actors like the non-governmental organizations such as Action Aid, ICRC, and the World Vision have also advocated for and developed community-driven approaches to the mitigation of flooding in these environments (IFRC, 2010). However, flooding in the urban and peri-urban settlements is reported to be getting worse globally; and participation by homeowners in the community-driven initiatives are also observed to be low (Douglas et al., 2008; Victoria, 2005).

It is with this background that this study sought to provide an understanding of urban flooding in Kenya from a psycho-social perspective. The specific objectives were: to establish a basis for a study associating the onset of flooding with environmental attitude and behaviour; to set ground for an investigation relating the effect of flooding on households to environmental attitude and behaviour; provide a background for analysis to correlate the level of humanitarian support during flooding with environmental attitude and behaviour; provide a basis for evaluation of possible attitude and behavioural change approaches to enhance efficiency of urban flood disaster interventions; and to develop a conceptual framework the study of urban flooding in Kenya from environmental attitude and behavioural perspective Gabriel, B. (2018), Sibomana, E. (2018), Omer, A. M. (2017).

2. Research Methods

This was a desk-top survey. It involved a review of the literature on, among other areas, triggers of flooding in urban environments; effect of flooding; humanitarian interventions for disaster victims; human attitudes and behaviour; environmental abuse, degradation, and conservation; as well as urban populations' livelihood practices.

3. Results and Analysis

3.1 Associating onset of flooding with environmental attitude and behaviour

Urban environments are experiencing rapid population growth in unsustainable proportions having been home to about half of the world's population in 2008; and the proportion estimated to rise to 60% in 2030, and 70% in 2050 (Jha et al., 2011; UN-HABITAT, 2010). Although this phenomenon was initially associated with developed countries, it is fast engulfing developing countries like Latin America where more than 75% of the population lives in urban areas compared to the global rate of 47.2% (WRI, 1996). On the other hand, 40% of Africa's population, and 23.5% of the East African population lived in urban areas in 2009; and it is projected that about half of Africa's population would live in cities and towns by the year 2030 (UN-HABITAT, 2010).

Accommodating the increasing population poses a major challenge for the city and town administrations leading to spontaneous, uncontrolled expansion of urban informal settlements with the consequence of unprecedented environmental degradation (Chukwuocha & Chukwuocha, 2013; ILGS & IWMI, 2012). In addition, African cities like Accra, Cairo, Johannesburg, Maputo, and Nairobi have expanded their municipal boundaries to larger metropolitan regions (Amnesty International, 2009). Part of the populations acquire land and settle in the peripheral areas, many a time on floodplains and hillsides as illustrated by Soweto-on-Sea near Port Elizabeth and Alexandra in Johannesburg, South Africa; Bujumbura in Burundi as well as Nairobi in Kenya, but still feel they are within the city (Douglas et al., 2012; Jha et al., 2012; GoK, 2008).

As the cities and towns grow in sizes, the attendant urban problems have been observed to increase with serious environmental challenges such as blockage of natural waterways and creation of impervious surfaces arising from the paving of the surfaces, carefree dumping of solid waste as well as encroachment on natural waterways, wetlands and riparian areas (Chukwuocha & Chukwuocha, 2013; Amnesty International, 2009). This has aggravated the flooding in an urban area which has been observed as a growing problem affecting both the developed and developing countries as shown by the widespread flood events reported between 2010 and 2012 in America, Asia and Europe (Jha et al., 2012). African cities like Accra in Ghana, Kano in Nigeria, Kampala in Uganda, Maputo in Mozambique and Nairobi in Kenya have also witnessed perennial flooding incidences (Tucci, 2007; ILGS & IWMI, 2012). The worst flooding in Kenya occurred during the 1997-98 El-Niño induced rains; and since then, each rainy season, the larger Nairobi Metropolis experiences rain-fed flooding, when, like in other urban areas worldwide, even moderate storms cause increased runoff and higher flooding incidents (Amnesty International, 2009; GoK, 2009; Werritty et al., 2007).

National and local governments world over have implemented a range of state-driven structural and regulatory measures in line with HFA to tackle the challenge of environmental abuse in urban settlements (Oluyinka & Balogun, 2011; Douglas et al., 2008). Kenya has full ministries and departments that are in charge of the environment and water resources; and formulated legislation for proper physical planning and building control through the enactment of building codes, as well as environmental management regulations which are enforced by the concerned Local Authorities (UNISDR, 2005). In addition, social actors like NGOs and private agencies are also increasingly noticeable through community participation (Omondi, 2010). However, these approaches have not adequately tamed unsustainable urban land use where statistics show that environmental abuse and flood events in the urban environments are on the increase (ILGS & IWMI, 2012).

The inadequacy of the structural measures and legislative mitigation efforts to tame environmental abuse and reduce disaster risks in urban environments is seen where homeowners are increasingly reported to loath and circumvent the services of professionals; and to disregard authority and regulations as they acquire, develop and utilise their homes in the peri-urban settlements (Frazier, 2012; Jha et al., 2012). Property owners are also reported to acquire and build in dry river beds and riparian areas; dump refuse and waste in valleys and open fields; and put up unauthorized structures, all of which lead to runoff obstruction in urban environments (Amnesty International, 2009; UNISDR, 2006).

Past studies reported a correlation between environmental abuse tendencies and socio-cultural factors, which have been observed to alter with the increasing pressures on urban populations (Al-Khatib et al., 2009; Arafat et al., 2007). While Oluyinka and Balogun (2011) reported that positive attitude was necessary for voluntary participation in pro-environmental actions, there is no documented evidence of research linking the citizens' environmental attitude and behaviour to the occurrence of urban flood disasters. Hence, this review presents a basis for a study to associate the onset of urban flooding in Kenya with the population's environmental attitude and behaviour.

3.2 Relating effect of flooding to environmental attitude and behaviour

The twenty-first century has witnessed unprecedented levels of flood damage in urban environments as reported in Bangkok, Thailand (2011); Brisbane, Australia (2011); Guangdong, China (2007); New Orleans, USA (2005); Dresden, Germany (2002); and Taipei, Taiwan (2001) (Jha et al., 2012). African cities have also experienced an increase in frequency and severity of floods making the continent the second hardest hit after Asia; severely affecting residents in urban settlements (Douglas et al., 2008; Werritty et al., 2007). Infrastructure like clean water supply, sanitation facilities as well as services like electricity, education, and healthcare was disrupted and people uprooted from their homes (Dawson et al., 2008). There was also reported loss of livelihoods and reduced purchasing power amongst residents of these settlements due to the significant damage to private property, including homes and businesses from flooding (IFRC, 2013). In addition, flooding of facilities at the heart of the community has also been observed to disperse populations, negatively impacting on community cohesion (Dawson et al., 2008; Green & Wilson, 2004).

Urban flooding in Western Africa has been a cyclic event since1982; with the toll rising steadily up to 2010 when 1.7 million people were affected with 52,000 cholera cases recorded in Benin, Burkina Faso, Ghana, Nigeria and Togo (Amoako, 2012; Jha et al., 2012). Earlier, following 2005, 2007 and 2008 flooding in Accra, Ghana, the outbreak of diarrhea, dysentery, and cholera was reported to have claimed over 2,000 lives and severely affecting over 500,000 people (Karley, 2009). Despite Northern Africa being predominantly arid, Jha et al. (2011) reported that over 8,800 lives were lost between 1927 and 1995 in Algeria, Tunisia, Egypt, and Morocco due to flooding in urban environments. Similarly, the Sahel region in Central Africa, usually associated with desertification, has also recorded major flood events with Chukwuocha and Chukwuocha (2013) documenting major flooding in Mali (2002, 2003, 2007), Niger (2003, 2007, 2008), Chad (2001, 2007, 2008), and Sudan (2003, 2006, 2007).

In Eastern Africa, over 210 people died and thousands were rendered homeless by flooding between 2002 and 2006 across Burundi, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda; with the worst affected having been Ethiopia (in 2005 and 2007) and Uganda (in 2004 & 2007) (Amnesty International, 2009; Douglas et al., 2008; UN-HABITAT, 2006; Werritty et al., 2007). Jha et al (2011) also reported that urban flooding in Southern Africa had caused 1,148 deaths, rendered 500,000 people homeless and jobless, and destroyed 150,250 homes and many assets in Mozambique, Zimbabwe, South Africa, Zambia and Namibia between 2000 and 2009. This analysis shows that over the last two decades, more countries in Africa have experienced urban flooding than any other continent.

Earlier studies show that urban populations suffered more impact of flooding compared to their rural counterparts (Dawson et al., 2008). In addition, while observing that people in rural areas were more pro-nature with a higher sense of a community amongst them, Twigger-Ross (2005) also reported that it was harder to organize community groups in urban areas, suggesting that rural areas have better structures for the organization at the grass-roots for enhanced resilience. Further, in linking the social drivers of physical hazards to the social impacts therefrom, Evans et al. (2004) found that social factors were a strong determinant of the impact of calamities and disasters like fires and deaths. Considering demographic variables, Walker et al. (2005) reported that older people in Europe were more troubled by the loss of sentimental items like photographs and an adulterated home than younger people; while Dawson et al. (2008) reported that victims got stressed by the life of relying on goodwill from well-wishers.

The foregoing analysis presents a conviction that the effect of disasters is an issue of environmental concern, but there is no documented evidence of a similar research in Kenya. This presents a basis for a study relating the effect of flooding on households to the population's environmental attitude and behaviour.

3.3 Correlating humanitarian support to environmental attitude and behaviour

In the wake of the flood disruptions, national governments first declare a state of emergency in the inundated regions to set-off the emergency management and humanitarian assistance for the victims (GoK, 2009). At the international level, the response by organizations like the International Committee of Red Cross and Red Crescent (ICRC), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the United Nations Disaster Assessment and Coordination (UNDAC) among other actors is within an international legal and policy framework. It is within this international framework that the multinational actors deployed support for emergency operations in Scotland, Pakistan, Brazil, Sri Lanka and Australia following the recent flood events (IFRC, 2013). In Africa, the ICRC and World Vision have been noted to deploy teams to support humanitarian activities in Ghana, Mozambique, Uganda and Kenya through their regional offices as was seen in Accra after the 2007 flooding (Karley, 2009; OCHA, 2008).

At the national level, most African governments have special ministries and/ or departments responsible for disaster mitigation (Action Aid, 2006). Each country has a legal, institutional and policy framework to guide the emergency

response and humanitarian support operations with regard to issues such as strategic stockpiling of food and other essential supplies (OCHA, 2008). Every country also has a national disaster and emergency agency to coordinate emergency and disaster response in a multi-agency approach by all stakeholders such as the Ghana National Disaster Management Organization (NADMO) and Master Plan for Prevention and Mitigation of Natural Disasters (in Mozambique), which work with local communities, NGOs, and donor organisations to enhance their ability to minimise the effects of disasters, which is a key component of poverty reduction as spelt out in the Millennium Development Goals (World Bank, 2003).

In Kenya, the legal framework is available in the various legislative acts as listed by Mutugi and Maingi (2011). They includes: The Water Act (Cap 372); The Public Health Act (Cap 242); The Malaria Act (Cap 246); The Medical Practitioners and Dentists Board (Cap 253); The Food, Drugs and Chemical Substances Act (Cap 254); The National Cereals and Produce Board Act (Cap 388) and The Preservation of Public Security Act (Cap 57) amongst others. In spite of the legal framework, the response to the increasing disruption by urban floods does not seem to have any special treatment in the National Disaster Management Policy as they take time to attract response from the concerned authorities (IFRC, 2010). Hence, response to flood events in urban settlements has mainly been individual or household-based by creating high places in their homes on which they put valuable items; temporarily vacating their residence to other safer locations; and/or constructing barriers to prevent ingress of flood water into their houses (Douglas et. al., 2008).

There is the realization that solution to the increasing challenges of urban flooding have to be derived from within these environments where the government and other actors have started incorporating home-grown coping mechanisms for each home and property owner (Mutugi & Maingi, 2011). There are enhanced public education and awareness campaigns as seen during the 2009 floods in Nairobi, to mitigate environmental health hazard (Smith, 2009). Thus, given that the success of any emergency management interventions anchored in community participation lies with an individual as opposed to a social group, adequate commitment and participation by home and property owners are imperative (Victoria, 2005). However, there is no evidence of a link between legislation and policies by government and knowledge, attitude and practice at the community level (Mutugi & Maingi, 2011).

Different scholars have conducted studies to explore citizens' living environment in relation to other variables such as demographic factors, experience and personal values (Houston et al., 2011). While Oluyinka and Balogun (2011) reported that individual's participation in community initiatives is determined by one's mindset about factors in their everyday lives, people with low income were more united in fighting petty crime in the settlements (Kruger & Landman, 2008), as younger people more readily pooled together vehicle use than older ones (Flamm, 2006). These studies present psycho-social complexities and dynamics for community survival in times of need. Thus, this review presents a basis for research to determine the possible effect of the population's environmental attitude and behaviour on the humanitarian support given to the victims of flooding in urban and peri-urban settlements.

3.4 Attitude and behavioural change to enhance flood disaster interventions

Many impacts of floods are similar to those of other disasters; and the responses thereto by different agencies, are also similar in most parts of the world (ADPC, 2008). Although the humanitarian response by different agencies covers affected people's immediate survival needs over the emergency period, there have been many experiments globally aimed at improving flood risk management, readiness for response and community preparedness. For example, Alam et al (2007) reported that were measures for risk reduction were an integral part of the overall development process, communities were more prepared to respond to disasters.

In informal and peri-urban settlements with financial and social constraints, residents developed their own coping mechanisms were they on social capital such as reciprocal support among neighbours; and from immediate family members and wider kinship networks in coping with disasters and other calamities (Alam et al., 2007). In this arrangement, members of the local community are able to mobilize logistics for operations as was the case following the 2004 floods and mud-slide in Bangladesh where the initial search and rescue efforts involved community members mobilizing local equipment (World Bank, 2003). There have also been efforts to address people's critical vulnerabilities to disasters and to ensure that humanitarian support is met through adequate preparedness and contingency planning (Action Aid, 2006; Sphere Project, 2004). This arrangement calls for the creation of functional groups, developing organizational capacities and enabling them to link with the national disaster management mechanisms as effective ways of strengthening preparedness at the community level (IFRC, 2010).

While Oxfam (2008) reported that choice and use of multiple materials and technology protected people from climatic conditions without adversely affecting the local environment, raising the plinths for flood shelters was an

effective flood-proofing measure (DFID, 2001), as keeping space for livestock in flood shelters was effective in sustaining sources of livelihood (IFRC, 2010). These approaches were found to be more effective when homeowners took key decisions, as NGOs and the government provided material and technical support (CARE, 2005). It was also reported that quality water supply was critical during disasters to minimize the risk of increased water-borne diseases (Smith, 2009). Thus, the affected population needs to know the source and safety of water leading to the longer-term advantage of community ownership and acceptability (Victoria, 2005).

In addition to adequate flood-shelter and quality water supply, effective sanitation is necessary to prevent disease outbreak, hence the need for the excreta to be contained in the quickest time possible to prevent the spread of infections during flooding in peri-urban and urban settlements (IFRC, 2010). The communal latrines used during emergency fill up quickly and become hazardous with increased cases of giardiasis among children Lora-Suarez et al. (2002). Agencies are reported to be poorly equipped to deal with the rapid provision of pit latrines in urban emergency contexts due to a high water table, concrete sites, or lack of permission thus, calling for reliance on the communities' internal mechanisms (Bastable & Lamb, 2012; Johannessen, 2011; Harvey & Reed 2005; Wisner & Adams, 2002).

This study reveals that the effectiveness of agency interventions was influenced by factors based on the context and circumstances (CARE, 2005). However, there is no documented evidence of studies carried out in Kenya on the psycho-social approach to enhancing disaster intervention. Thus, this review presents a background for a study to explore attitudinal and behavioral change approaches to enhance community participation in urban flood disaster interventions in Kenya.

3.5 Summary of findings

The reviewed literature revealed that livelihood and socio-economic practices among populations exacerbate environmental abuse such as paving of the surfaces, carefree dumping of solid waste as well as encroachment on natural waterways, wetlands and riparian areas which led to blockage of natural waterways and creation of impervious surfaces identified as the main triggers of flooding in urban environments. It also revealed that urban populations where it was harder to organize community groups suffered the impact of flooding more compared to their rural counterparts; and victims of disasters got stressed by reliance on goodwill from well-wishers, with demographic variables strongly determining the feeling of loss.

The literature further revealed that the success of any communal interventions lies with an individual as opposed to a social group, thus adequate commitment and participation by home and property owners is imperative. People with low income were more united in fighting for a common good; while younger people more readily pooled together vehicle use than older ones thus presenting psycho-social complexities and dynamics for communal survival. Finally, the analysis revealed that in urban informal settlements with financial and social constraints, residents developed their own coping mechanisms where they relied on social capital to mobilize logistics for operations following disasters; and effectiveness of agency interventions was influenced by factors based on the context and circumstances.

4. Conclusion

This study concludes that there exist gaps that provide an opportunity for investigation of urban flooding in Kenya from a psycho-social perspective. The study presents a basis for an investigation to associate the onset of flooding with environmental attitude and behaviour, and to relate the effect of urban flooding to environmental attitude and behaviour. The study also presents a basis for research to determine the possible effect of environmental attitude and behaviour on the humanitarian support given to the victims of flooding, and a background for an exploration of behavioral change interventions to enhance community participation in urban flood disaster interventions in Kenya.

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Statement of authorship
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