Urban Design and Urban Disasters: Lessons for Nigeria

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1 ABSTRACT

Urban design has been described as being 'about the making of better places for people'; therefore the growing trend of natural and human-induced disasters should be areas of key concern to urban designers and other built environment professionals. Earthquakes, typhoons, landslides, flooding, explosions, and other disasters related to global climate change have increased in frequency and intensity. This paper explores the links between urban design and urban disasters – that is, disasters that directly or indirectly impact the urban realm. It identifies and attempts a categorization of disasters, with reference to their urban character. It reflects on a number of questions, and attempts to find answers to these from the literature and through lessons gleaned from the archival records of past urban disasters. The key questions include: What is the role urban design in urban disasters? Are there ways that urban designers can be trained to meet the increasing need for disaster-preparedness and disaster-mitigation? What lessons can urban designers learn from urban disasters? The conclusion is drawn to inform further research and policy-making in the context of a developing nation like Nigeria.

2 INTRODUCTION

2.1 Global Overview of Disasters

Urban design has been described as being 'about the making of better places for people' (Carmona, Haeth, Oc & Tiesdell, 2003). This justifies why the growing trend of natural and human-induced disasters should be a key area of concern to urban design and other built environment professions. Charleson and Taylor (2000, 2004) attempt to integrate architecture and earthquake disasters, but less attention has been paid to the role of urban design in urban disasters; hence this study. Earthquakes, typhoons, landslides, flooding, explosions, and other disasters related to global climate change have increased in frequency and intensity. For many developed and developing countries, the national, regional and local capacities to respond to the increasing frequency and impacts of disasters have been strained. Globally, the costs of natural disasters are increasing (World Bank, 2010). According to the UN disasters reduction agency, natural disasters such as the huge earthquake and tsunami that struck Japan caused unprecedented $366 billion damage in 2011, while a total of 29,782 people were killed in 302 disasters in the same year. Storms and floods accounted for up to 70 percent of disasters but earthquakes were the most fatal (UN-ISDR, 2011).

Extreme weather events are on the rise due to anthropogenic drivers of global climate system. Extremes of temperature, precipitation, droughts, storms, and floods are projected to be more frequent in diverse parts of the world (Muir-Wood, Miller & Boissonnade, 2006). These are compounded by urban growth, particularly those concentrated in close proximity of the coast, exposing greater numbers of people and infrastructure to extreme weather events. The mass migration from rural to urban areas puts great populations around the world at risk – since many major cities are located near coasts and fault lines (IPCC, 2007). The rapid growth of cities has led to an urbanization of vulnerability and resultant increase in urban disasters, which the predominantly rural experience of humanitarian agencies has proved inadequate to handle (IFRC, 2010).

According to CRED (2012) some of the most recent and severe disaster case-studies on the global headlines include: the Haiti earthquake (January 2010); floods in Brazil (January 2011); earthquake in New Zealand (February 2011); Japan's earthquake and tsunami that sparked the Fukushima nuclear plant catastrophe (March 2011); Hurricane Irene in the United States in August and September 2011; earthquake in Turkey (October 2011); devastating floods in Thailand and Queensland (Australia) in late 2011; and the tropical storm *Sendong* that hit the Philippines in December 2011. In 2012, there has been landslide disaster in Philippines; floods in Thailand, Indonesia, Namibia, Fiji, and Australia; avalanches in Afghanistan; extreme winter condition in Europe; and tornadoes in the United States.

2.2 Disasters in Nigeria

In July and August 2011 Nigeria witnessed devastating floods which forced whole communities to evacuate homes in Lagos, Ibadan and other major cities, with thousands of buildings washed away, and hundreds of fatalities (See Figures 1 – 4). Gully erosion has reached disaster dimensions in many parts of Eastern Nigeria (See Figure 5). There has also been environmental degradation (figure 6) and violence in the Niger-Delta region, and more recently, terrorist activities by an Islamic extremist group – the *Boko Haram*, which has claimed thousands of lives and devastated wide array of the public realm.

The Nigerian coast is one of the low-lying coasts in Western Africa which is likely to experience severe effects from flooding due to rising sea levels and climate change (UN-HABITAT, 2008). The frequent ocean surge in Lagos, for example, continues to erode the coastline, threaten buildings, infrastructure, and the existence of communities. Yet the city continues to grow exponentially in the face of increasingly extreme weather events, while the low lying nature puts it at further risk from flooding, exacerbated by inadequate refuse and waste disposal systems. The impacts of the floods include damage to roads and household properties, dirty environments, infrastructural damage, homelessness, disruption of movements, lack of potable water, prevalence of malaria and other diseases. Despite the environmental challenge posed by flooding due to storm surges and heavy rainstorms exacerbated by urban development, the vulnerability of the urban poor has not been given adequate consideration in urban planning.

2.3 Purpose of the Study

This paper explores the links between **urban design** and **urban disasters** – that is, disasters that directly or indirectly impact the urban realm. It identifies and attempts a definition of disasters, with reference to their urban character. It reflects on a number of questions, and attempts to find answers to these from the literature and through lessons gleaned from the archival records of past urban disasters. The key questions include: What is the role of urban design in urban disasters? Are there ways that urban designers can be trained to meet the increasing need for disaster-preparedness and disaster-mitigation? What lessons can urban designers learn from urban disasters? It concludes on the note of informing further research and policy-making in the context of a developing nation like Nigeria.

Fig. 1: Floods at a neighbourhood, Ibadan, Nigeria (Source: http://pmnewsnigeria.com/2011/08/28/floods-rock-ibadan-residents/)

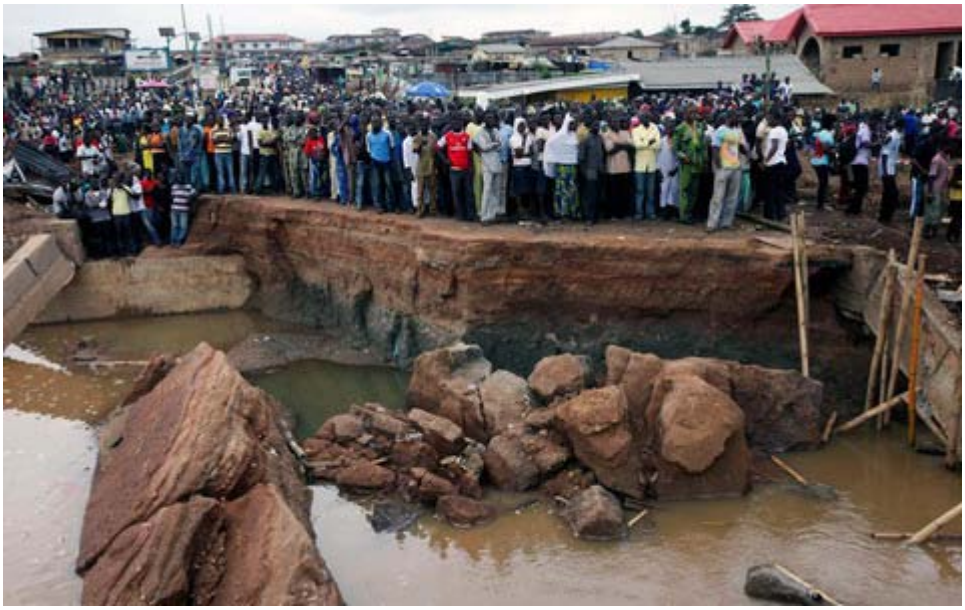

Fig. 2: Flood disaster and bridge wreckage, Ibadan (Source: http://safeafricagroup.com/2011/09/01/flood-disaster-in-nigeria/).

Fig. 3: Pedestrians wading through flooded urban street in Lagos (Source: pnnewsnigeria.com_2011_07_11_aftermath-of-floods-).

Fig. 4: Rainstorm uproots massive billboard column, Lagos (Source: pnnewsnigeria.com_2011_07_11_aftermath-of-floods-)

Fig. 5: Homesteads perch precariously at gully's edge in Southeast of Nigeria (http://www.kwenu.com/publications/orabuchi/2006/3erosion_calamity.html).

Fig. 6: Elume River Oil-spill-fire disaster in Delta State, Nigeria (Source: http://waado.org/Environment/OilFires_2000/ElumeRiverFire/).

3 LITERATURE REVIEW

3.1 Defining Disaster Groups

CRED/Munich RE (2009) defines two broad generic disaster groups: natural and technological. The former is further divided into six groups – Biological, Geophysical, Meteorological, Hydrological, Climatological, and Extra-Terrestrial – each group covering different disaster main types.

Disaster Generic Group	Disaster Group & Definition	Disaster Type (and Sub-type)
Natural disaster	Geophysical: events originating from solid earth:	Earthquake (Ground shaking, Tsunami); Volcano (Volcanic eruption); Mass movement (Rockfall, Avalanche, Landslide, Subsidence).
	Meteorological: events caused by short-lived/small to meso scale atmospheric processes (ranging from minutes to days)	Storm (Tropical; Extra-tropical etc)
	Hydrological: events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up	Flood (River flood, Flash flood, Storm surge/Coastal flood etc)
	Climatological: events caused by long-lived/meso to macro scale processes (ranging from intra-seasonal to multi-decadal climate variability)	Extreme temperature (Heat wave, Cold wave etc); Drought; Wild fire.
	Biological: disaster caused by the exposure of living organisms to germs and toxic substances	Epidemic (viral, bacterial, parasitic, fungal infectious diseases); Insect infestation; Animal stampede
	Extra-terrestrial	Meteorit/Asteorit
Technological	Fire/Chemical/Nuclear explosions Shipwrecks & Transport disasters	

Table 1: Disaster classifications and definitions (Source: Adapted from CRED.Munich RE, 2009)

A clear distinction can be drawn between urban disasters and other forms of disaster such as drought, famine, civil wars, urban conflicts, genocide, and technological disasters such as transport-related accidents, fire or chemical/nuclear explosions. Most of these are either gradual in character or accidental, and are not necessarily limited to urban settings. Records of famine and drought in Africa for example, show that they generally affect the poor rural populace more than urban populations (Pelling & Wisner, 2009). Urban disasters on the other hand are often sudden, spectacular, and severe, but not accidental, and usually have a unique urban impact. This paper focuses on urban disasters, particularly those that may potentially be mitigated or reduced through urban design and planning; in this case, earthquakes and floods.

3.2 Uniqueness of Urban Disasters

Urban disasters refer to those which directly or indirectly impact the urban realm, with their distinct challenges, for which rural approaches would not suffice. Disasters are increasingly situated in urban areas, where they are often critically unaddressed. Rural approaches are inadequate to meet the challenges of cities in terms of high population densities, shortage of land and a complex and closely inter-connected economic and social ecosystem. This paper examines the potential role of urban design in proactive, pre-disaster planning, and post-disaster reconstruction of urban areas in the recovery phase of emergency responses.

IASC (2010), IFRC (2010) and World Bank (2010) highlight the increasing incidence of urban disasters and the unique challenges faced by humanitarian actors in providing assistance. Large scale urban vulnerability evidenced in the proliferation of slums and squatter settlements in an increasingly urbanized world has heightened urban risk and brought the issues of urban disaster, disaster risk reduction (DRR), mitigation, response and reconstruction to the front burner (Zetter & Deikun, 2010). IASC (2010) identifies key differences between rural and urban emergencies, and the subsisting inadequacies of humanitarian agencies' capacity to respond to urban disasters, relative to rural ones. These include the interactive impacts of the higher density and concentration of population and economic resources in urban areas, the resulting complexity of their interactions, a scarcity of land, and the corresponding higher losses and greater demand for assistance. High population densities are likely to infer greater building heights, closer proximity of buildings, more severe sanitation problems, ease of disease spread, and larger numbers that may be killed or injured due to building collapse, a major cause of earthquake fatality (Cosgrave, 2008; Clermont *et al*, 2011).

Other related features are the heterogeneity, social segregation, and limited social capital in urban settings which inhibit communal attitudes required for disaster situations. Communities in rural areas tend to be relatively homogeneous with established self-help traditions which encourage investing in shared services, a good platform for humanitarian interventions (Schilderman, 2010). Damage to the urban physical environment also entails disruption to the economic, social and political aspects of urban areas (Boano & Hunter, 2011). The impact of urban disaster is however not limited to cities: where a city is strongly connected to its peri-urban and rural hinterland, these may indirectly suffer collateral damage resulting from disruption of the urban economy, services and supplies. These intricate links infer the need for a more integrated approach to reconstructing urban areas.

3.3 Flooding

Records of disasters in Nigeria indicate that flooding has been a principal form of disaster, hence the need to examine it more closely. Flooding accounts for about 40% of all natural disasters worldwide and causes about half of all deaths (Ohl & Tapsel, 2000). Floods appear to have become a reality of the contemporary world that even in developed countries attention has shifted from protection against floods to managing flood risks, which demands interdisciplinary and participatory researches (Mostert & Junier, 2009). The risk of flood is growing and there will probably be an increasing number of floods in the future due to changes in weather patterns, new building on low-lying areas and other local contextual factors. Apart from reducing the structural and economic values of properties, floods threaten human safety, and often result in long durations of dislocation and disruption.

Floods may be due to ***surface water flooding*** in times of heavy rain (flash floods) especially in urban areas where the grounds consist of mostly hard surfaces such as concrete or tarmac; and ***groundwater flooding*** during long and intense rainfall when infiltration into the ground raises the level of the water table until it exceeds ground levels, especially in low-lying areas or in areas with a naturally high water table. Other forms are ***river flooding*** which occurs when rivers and streams are unable to convey floodwaters within their usual

drainage channels, and ***coastal flooding*** due to high tides coinciding with a low-pressure storm system which raises sea and tidal water levels, overwhelming coastal defences. At the macro scale, a reservoir or ***dam failure*** could cause extensive flooding. Apart from the source of flooding, flood risk is also a function of the location of a building and the nature of soil on which it is erected (RICS, 2010). Many flood resistance and flood resilience measures are in use in the developed countries, but these may not be economically feasible in the developing world due to the high level of poverty and lack of infrastructural base and expertise required for such measures.

4 DISCUSSIONS

From the foregoing, it becomes pertinent to examine and discuss the limitation and potentials of urban planning with respect to urban disasters; urban planning guidelines that have been developed and utilized in past disaster cases; and the role of urban design in urban disasters, in terms of enhancing community resilience, aiding post-disaster reconstruction and providing an alternative approach.

4.1 Limitation and Potentials of Urban Planning

Conventional urban and spatial planning is regarded as essentially static in nature and unable to keep pace with the dynamism of cities. Wamsler (2006:10) describes master-plans as 'centralist, social planning' that tend to assume a slow pace of change and often fail to consider the impact of the economy on the need for different types and amounts of spaces. Structural or strategic plans have therefore been proposed as being more flexible as these identify critical issues, set priorities for investment, and provide frameworks for decision making at the smaller scale of the neighbourhood (UN-HABITAT, 2009). Such type of urban planning provides the possibilities of participation and decentralisation within a wider strategic framework, than is the case in conventional master planning.

Architects and urban planners often approach urban challenges from the notion of *tabula rasa*, assuming a "clean slate" of operation. The reality of urban disasters however queries this notion. Post-disaster lands in many cases are occupied by the ruins of original buildings (or their reconstruction), by temporary shelter for those who have lost their homes and potentially also by rubble, thus representing a sudden surge in the demand for land, and definitely not a 'clean slate' of operation. Although with regard to urban places, disasters are characterized by chaos and make their mark through disorder and destruction, they do not literally leave an empty site.

Some researchers have advocated the use of tools derived from the larger scale approach of urban planning to meet post-disaster reconstruction needs (Shelter Centre, 2010a, 2010b). Sengezer and Koc (2005) posit that land use planning as part of an appropriate planning system can serve as a very useful instrument for mitigating the extent of disaster damage. Kennedy *et al.,* (2008) recommend the incorporation of spatial planning into disaster reconstruction, suggesting a series of measures to reduce the vulnerability of settlements to further risk, namely: the construction of evacuation routes, placement of shelters and infrastructure to reduce exposure to water flows, reducing and channelling surface run-off following heavy rain, and providing fire breaks between buildings. Good as these guidelines are, they appear inadequate to meet the integrated requirements of urban areas (Killings, 2011). The community level measures proposed in Kennedy *et al* (2008) and Shelter Centre (2010) need to be seen in the larger scale context, as well as in terms of their impact on the individual household level. For example, recommendation for the widening of roads may imply building higher structures or reducing their sizes, due to the limited land available. The difficulty in unplanned settlements is in introducing services without destroying houses; and the extensive negotiation required in restoring buildings, infrastructure and services (Schilderman, 2010).

4.2 Urban Planning Guidelines

Hosseini *et al* (2009) provide urban planning guidelines for enhancing emergency response capacities in earthquake-prone areas of Iran, in terms of emergency response operations, emergency medical care, emergency transportation, and evacuation. These criteria could be made context-specific and adapted into the comprehensive plans for sustainable post-earthquake reconstruction of other cities.

4.2.1 Location and standards of emergency facilities

Emergency Operation Centres (EOCs), Emergency Response Management Bases (ERMBs), and Emergency Medical Care Units (EMCUs) and hospitals are key facilities that should be appropriately located to help victims rescued by ordinary people or expert teams. These facilities require earthquake-resistant structures, infrastructure and lifelines, which should be constructed according to seismic codes appropriate for critical structures, while non-structural elements should as much as possible, be located in safe areas far from potential hazards. EOCs, ERMBs and EMCUs should not be erected adjacent to potential geological and man-made hazards that may adversely affect their performance after an earthquake. They should be located along emergency roads of appropriate widths and that are constructed according to specifications that meet the demands of rescue operations, in order to enjoy proper access to an entire affected area, including the need to accelerate transportation of the injured to hospital.

4.2.2 Flexible design of emergency facilities

The architecture and urban design of these facilities should be such that they can expand their capacities after an event, with adequate space provided within and around them for this purpose. A balanced distribution of EOCs in seismic-prone zones should consider access to critical sites, hazardous facilities, vulnerability level, and population density. The EOCs or district-based ERMBs should possess earthquake-resistant structures, and emergency supplies of electricity, water, and telecommunication systems, with the main function of post-disaster coordination of emergency responses and logistics provision at the local level.

4.2.3 Open spaces

There is the need to strategically establish open spaces at vulnerable sites in urban areas that can accommodate emergency equipment and support helicopter operations used in creating field headquarters for emergency response management. Such selected open lots, preferably in the proximity of existing hospitals, can enhance the setting up of field hospitals.

This paper suggests the complementary role of urban design, which could be more relevant to humanitarian agencies working on reconstruction in urban areas in the recovery phase of emergency responses. Within such an approach, smaller scale interventions could realistically link emergency relief to the longer term process of development. Unlike urban planning, the interdisciplinary nature of urban design – linking elements from architecture, urban planning, landscape architecture, real estate development, urban geography, civil engineering, sociology, economics, and law – appears to make it more appropriate to meeting the needs of disaster reconstruction. It mediates between the demands of the scale of individual buildings, the wider neighbourhood or community, and societal needs by providing detailed, localised rules for density, mixed use and the organisation of the public realm (Moudon, 2003).

4.3 Urban Design and Community Resilience

Although disaster preparedness, mitigation and management are inter-disciplinary operations, the role of urban design cannot be overemphasized, and requires specific enquiry. Wamsler (2008) suggests the need to plan ahead and adapt settlements with built-in resilience prior to the onset of disasters. Wu and Lindell (2004) present the benefits of pre-impact recovery plan in facilitating housing reconstruction and disaster mitigation. Good quality urban design which encourages interaction amongst neighbours can contribute to community resilience, which can help with preparedness and recovery, enabling neighbourhoods to rebound and revive quicker, thus minimising the impact of natural disasters. Building individual and community resilience is integral to the ability to disaster responsiveness. Disaster resilience strategies should therefore aim at supporting measures to strengthen communities, individuals, organizations and institutions to minimise the adverse effects of disasters. This improves the ability to prevent, prepare, respond to and recover (PPRR) from disasters across social, economic, environmental and governance domains. Disaster experiences globally indicate that the majority of victims are often rescued by local residents and neighbours, demonstrating the importance of the involvement of local residents in emergency operations. Urban design approaches which encourage community cohesion and integrate the capacities of local people could by extension enhance the success of emergency operations (Hamdi, 2010). Before and after disasters, intimate and interacting neighbours tend to care and look after each other – especially those, like the elderly, who need assistance. With the projected increase in frequency and intensity of natural disasters, good urban design outcomes which enable community resilience should be promoted.

Urban design and place-making can therefore minimise the impact of natural disasters in ways which relate to their contributing to community resilience: in terms of social capital, social cohesion and sense of community, and community involvement. Good urban design can play a significant role in building social capital, the ability to form and maintain relationships to facilitate goal and objective attainment. Urban places can be designed to facilitate interaction between people – residents, workers, neighbours and users of places, to enable the nurturing of relationships. The streets, footpaths and open spaces could be overlooked by buildings to facilitate interaction. For example, houses which have a front veranda or porch to the street enable residents to interact with neighbours and passers-by.

4.4 Urban Design in Reconstruction

Killings (2011) examines the role of urban design in the reconstruction of urban areas in the recovery phase of a humanitarian response, and suggests a series of ways in which urban planning and urban design approaches to the production of the built environment in non-emergency scenarios could be adapted to disaster situations. Killings identifies three main roles for urban design: (i) coordination of interventions at a smaller scale through the production of maps, diagrams and drawings in order to prevent gaps and overlapping, disjointed interventions; (ii) linking long term, larger scale strategic vision to short term, small scale interventions; and (iii) the ability to synthesize information and provide a spatial framework for resolving competing spatial, social, economic and political demands. That is, in responding and giving form to a wider set of priorities, urban design can link to larger, city and regional scale strategic plans, where these exist. The coordinating of neighbourhood reconstruction will require comprehensive maps with adequate level of details, which describe land parcel boundaries, building outlines and open spaces. This will ensure the avoidance of conflicting interventions, as well as the identification and filling of geographical gaps in the response to disasters.

Social cohesion can also be enhanced by the place-making quality of inclusiveness and interaction. Urban designers can design active, safe and well used streets, parks and squares, active edges; activities in and overlooking public spaces; and comfortable, vibrant and interesting places. Good urban design introduces, maintains and intensifies human interaction within the public realm and enables these connections to be built over time. It is these social connections which ultimately create social support which can be accessed during times of trouble or crisis, and in times of support and calm. Urban design and place-making can minimise the impact of natural disasters (Hamdi, 2010).

4.5 Urban Design Options

In morphological terms, the city form can potentially determine the capacity of floodable rivers. The interface between city form and floodable rivers may require re-invention and active interrogation rather than passive submission to capricious events. Urban design offers options that relate to neighbourhood structure, esplanades and promenades, designing for universal access, and legibility. Urban design can encourage environmentally-friendly use of urban spaces and infrastructure, and help people to value places and relate with them through clean, tidy and healthy habits that will augment their sustainability on the long-term.

Urban design that takes cognisance of disasters would consider the need for highly functional emergency roads, with appropriate width, gradient and adequate buffer, as vital links between disaster management centres and means of easy access by response teams and emergency vehicle traffic. All of these have significant implications for urban planning, which should consider revising land-use regulations along roads, enforcing the building code for new constructions, and re-checking the design, construction procedures, and materials employed in relation to existing buildings in disaster-prone areas (Lindell, Prater & Perry, 1997). Key facilities must be clearly identified and prioritised for selecting optimum paths between them using emergency traffic control systems enhanced by GIS base maps. Effective emergency evacuation – before or after an imminent disaster – is a function of good urban design. This may necessitate identifying and allocating suitable places in advance, to provide temporary shelter to residents, based on well-articulated design criteria. Such places could be selected from among structurally sound buildings and existing open spaces at the community level that have the necessary capacity and amenities to meet people's immediate needs. Communities may assist in pinpointing such sites and help to prepare them for emergency evacuation. Depending on weather conditions, open spaces around residential areas, such as parks and playgrounds, could also be considered as emergency evacuation sites.

Murao (2008) provides a scheme for integrating the areas of spatial design and disaster management based on architectural, urban design, and landscape design case studies in Japan, and goes as far as advocating a new interdisciplinary field between architecture and disaster management. Murao also identifies architectural and urban design elements such as stone walls in response to typhoon, pinewoods to respond to tsunami, stand-up dam in response to volcanic eruption, post-disaster temporary housing, earthquake-resistant reinforcement work, open evacuation spaces, and the design and construction of disaster prevention bases.

Urban design can be conceptualized within the theoretical framework of disaster life cycle, which consists of mitigation, preparedness, response, and recovery (Murao, 2008). Mitigation may be structural (e.g. earthquake-resistant design, fire-proof designs, stilted houses in flood-prone areas, sea-wall/levee against floods, stone wall or heavy roof construction) or land-use mitigation (e.g. restrictive zoning and building regulations). Disaster evacuation buildings/spaces, prevention bases, and provision of street furniture are aspects of preparedness and response, while the recovery phase may involve several individual or public activities aimed at supporting victims, especially the emergency provision of temporary shelters.

4.6 Training Urban Designers for Disasters

Linking urban design and urban disaster infers an interdisciplinary collaboration which integrates knowledge in urban design and urban planning with architectural engineering and environmental psychology to explore a new frontier of complex urban affairs. The emerging breed of urban designers are therefore expected to take initiative and proactively tackle current urban problems, such as urban redevelopment, community planning and seismic and wind disaster, by integrating engineering technology and planning methodology.

The knowledge base for urban design that is responsive to disasters would necessarily incorporate the principles and practices of sustainability. It would seek to contribute to advancing the sustainability of the natural and built environment, by recognizing the need for improved resource and risk management, and increasing resilience to emergency events, natural hazards and the impacts of climate change.

4.7 Lessons for Nigeria

Although Nigeria is not considered as a disaster-prone country, it has experienced a number of natural disasters, the most serious of which have been flooding, erosion, and oil-related explosions. Indeed, some of the physical and social effects of erosion in Eastern Nigeria are comparable to those in earthquake and landslide-prone regions of the world – destruction of lands and roads, building collapses, loss of homes, livelihoods and lives, and the difficulty of finding land on which to re-settle people. The EM-DAT (2012) country profile for Nigeria shows that: of the top 10 natural disasters for the period 1900 to 2012 sorted by numbers of total affected people, the most impactful is a drought disaster in June 1983 which affected 3 million people; the next eight are floods, while the tenth on the list is an epidemic. A flood disaster in September 2010 affected an estimated 1.5 million people. Similarly, most of the natural disasters with the highest economic damage costs have been floods. From the literature review and discussions in this study, three key lessons emerge relating to disaster risk reduction, data management, and the issue of scale.

4.7.1 Disaster risk reduction

It is important to try to reduce vulnerability to future disasters by incorporating disaster risk reduction (DRR) into the humanitarian response. Pelling and Wisner (2009) give particular attention to DRR in urban Africa, asserting that Africa has a critical mass of indigenous capacity to manage disaster risk, and recommending with some case studies that DRR be integrated with development and urban planning. The role of urban design in enhancing this indigenous social capital has been earlier highlighted.

4.7.2 Disaster data management

Researches on disasters consistently emphasize the need for comprehensive data-bases. Pourezzat, Nejati and Mollaee (2010) assert the importance and necessity of preparing a comprehensive and well-planned system for controlling and managing urban disasters and their consequences. Data bases of population density and the built environment derivable from geographic information systems (GIS) can aid emergency response management. Rapid estimates of earthquake impacts, compiled through aerial photos, satellite data, or seismic networks, are essential for proper management of available, limited emergency response resources during the post-disaster ‘golden hours’ (Adams, Mansouri & Huyck, 2005).

4.7.3 The Issue of scales

Urban design response to disasters may be implemented on at least two scales – the individual household and the neighborhood scales, and also coordinated at a city level. For most urban disasters, reconstruction on one site will inevitably impact on neighbouring sites. Also, reconstruction does not relate only to the rebuilding of residences, but also buildings that provide livelihoods (shops/markets), health, education, administration, security and other social and physical infrastructure, hence the need for a holistic approach (Jha *et al*, 2010). An effective reconstruction policy involves rebuilding communities, as well as empowering people to rebuild their homes and livelihoods. Interventions at different scales need to be perceived as interlinked – more like forming a nested series of scales with action at one scale reacting to and in turn impacting upon what happens at the others. Urban design approach to disasters provides a holistic and comprehensive alternative to the diverse humanitarian responses to discrete sectors. It helps to synthesize these diverse inputs and the efforts of individuals within a communal framework which can also link with larger scale programmes.

5 CONCLUSION

This paper explored the links between **urban design** and **urban disasters**, with a view to extracting lessons for Nigeria. The urban design literature was reviewed in terms of its relevance to urban disasters. Although urban design may not directly prevent the occurrence of various kinds of urban disasters, it can play a significant role in mitigating and reducing the physical and human tolls of disasters, and in shaping the physical form that reconstruction should take, striking a balance between the demands of individual interventions and the wider city planning aims and responding to related societal priorities. Construction and urban design are crucial enablers of social and economic institutions. An ineffectively designed and constructed environment makes a community more vulnerable to disaster. Disasters accentuate the subsisting problems of the places in which they occur; hence it is important that lessons learnt from former disaster management programmes are applied for a more resilient future. The paper discussed few lessons garnered which may enhance effective applicability in the context of Nigeria. Further researches and more education are apparently required about urban design, urban planning, their relationships with urban disasters and reconstruction, and their adaptation to specific forms of disasters and specific geographical or social contexts. It is expedient that the training of architects, urban designers, planners, and other built-environment professionals gives greater attention to the increasing global phenomenon of urban disasters, including those induced by the contemporary phenomenon of climate change.

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