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Disaster risk and its reduction: an agenda for urban Africa

Populations and assets, in African cities, small and large, are among the most vulnerable to disaster risk globally. Climate change and demographic shifts add urgency and uncertainty. This paper outlines priorities for research responding to this challenge. We argue for integrative approaches that can capture multi-hazard risk and include hazards from across the spectrum of everyday to catastrophic, and their interactions. For such approaches to shape policy, new efforts are needed to develop political support, technical capacity and methodologies to enable systematic data collection and analysis, including socially and spatially disaggregated data. We also argue for the interdependence of risk and urban development policy, and a focus on institutions as objects and partners for co-produced research, including local government as the focal point for risk reduction and new roles for civil society and the private sector. This emerging research agenda also needs to ask what it is that makes African cities distinctive globally, and yet diverse across the continent, in their experiences of risk production.

Keywords: risk accumulation, urban disaster risk, disaster risk reduction, urban governance, Urban ARC

Introduction

In 1998 Bill Gould observed that under-five mortality differentials were closing between rural and urban populations in Sub-Saharan Africa (Gould, 1998). His explanation for this included recognition of deteriorating capacity and underlying environmental health conditions in Sub-Saharan Africa's cities. Gould's paper was one of the first to offer a comprehensive and balanced analysis of rural and urban demographic trajectories and their underlying development drivers. The current paper offers a collective contribution to this special issue from a research team focussing precisely on the urban development drivers for environmental health and catastrophic disaster risk in Sub-Saharan African cities. Our work responds to Gould's central observation that African cities are in danger of missing the opportunities urbanisation brings for managing risk and reducing vulnerability within development. Our collective inheritance from Bill Gould's work is given particular relevance in this special issue celebrating Bill Gould's contribution through the project principal investigator, Mark Pelling, who graduated as one of Bill's PhD

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students in 1998. Mark was influenced by Bill's scholarship but perhaps even more by his ethos, that of an engaged professional, working always in parity with colleagues. Not too many professors travel to work on the local minibus.

Building on Gould's engaged professionalism and scholarly leadership, this paper makes a case for a more accurate and detailed understanding of African urban disaster risks, and of how the nature and scale of these risks are changing in the context of urban growth, persistent poverty and climate change. Research is needed that will not only generate stronger evidence on the nature and distribution of urban risk in Africa, but will also contribute to a better understanding of good practices in urban planning and governance, climate change adaptation and environmental and public health, and the institutional arrangements at the local government level that are required to reduce risk and build resilience to multiple hazards in specifically African urban contexts. African urban research leadership exists in the work of scholars such as Adelekan (2012), Kithiia (2011), Kiunsi (2013) and Lwasa (2010). This body of work is largely oriented towards case study research, hence a critical mass of material is being developed that opens opportunities for the systematic study of the particularities of African urban disaster risk and its reduction. This agenda is supported by networks of African urban and risk scholars, such as PeriperiU (<http://riskreductionafrica.org/en/home>), which can systematise training as well as research activity for disaster risk assessment and reduction. It is in this context that the current paper maps out an agenda for research on disaster risk and its reduction in urban Africa.

The spectrum of risk

It is widely acknowledged that urban dwellers in low- and middle-income countries are exposed to a multitude of hazards, across a range of natural and human-induced disasters. These include disasters arising from extreme weather events, a broad spectrum of infectious and parasitic diseases and accidents, including shack fires and road accidents, which are all highly prevalent in Africa (HPN, 2006; Pelling and Wisner, 2009; IFRC, 2010; World Bank and GFDRR, 2010). Although disasters are considered to be exceptional events that cause significant losses to life, health and property, evidence suggests that the cumulative impacts of such everyday hazards and small disasters are actually greater than those resulting from what can be termed large disasters (or events that meet official criteria for being defined as a disaster) (Bull-Kamanga et al., 2003; UNISDR, 2009; 2011; 2013).

The impacts of everyday hazards and small disasters are widely under-estimated in low- and middle-income countries mainly because they fail to meet the criteria to qualify as disasters in international databases (UNISDR, 2011). This has meant that a significant share of damage to housing, local infrastructure, livelihoods and low-income households affected by small disasters has been overlooked (UNISDR,

2009; 2011). For instance, Pelling and Wisner (2009, 34) find that much of the urban flooding (often seasonal), many disease epidemics and large shack fires that occur in African urban centres do not get recorded as disasters in national and international databases. Diarrhoeal disease and malaria linked to poor sanitation and drainage claim the lives of at least six million children in Africa each year (UNICEF, 2008). The risk of death from traffic accidents in Africa is also the highest among the world's regions at 24.1 deaths per 100,000 (WHO, 2013), as are risks from homicide at 20.17 per 100,000 (Fox and Beall, 2012). However, little is known about the nature and scale of these risks in urban areas due to the longstanding rural bias within policy, aid and research agendas (HPN, 2006). This bias has been challenged by the African Urban Risk Analysis Network (AURAN), which aims to 'ensure that international agencies, governments and civil society develop a better understanding of disaster risks in urban areas, and the actions that are required to reduce them' (HPN, 2006, 2; see also Pelling and Wisner, 2009).

This research agenda therefore conceptualises risk as a spectrum involving everyday hazards (i.e., illness from a foodborne or waterborne disease), small disasters (i.e., a few people killed or injured or properties damage, but too small to be classified as a disaster) and large disasters (i.e., sometimes classified as intensive risk; meeting criteria for inclusion in international disaster datasets) (see Bull-Kamanga et al., 2003). Reflecting this spectrum, the United Nations Office for Disaster Risk Reduction has developed the United Nations Strategy for Disaster Reduction (UNISDR), which includes the concepts of extensive risk (i.e., risk of premature death, injury/illness and impoverishment from all events whose impact is too small to be classified as major disasters) and intensive risk (i.e., risk from major disasters with the potential for 25 or more deaths and/or 600 or more houses destroyed or seriously damaged in one municipality/local government area) (UNISDR 2009; 2011; 2013). The lack of research on extensive risk in urban Africa presents an opportunity to learn from experiences elsewhere, in particular from Latin America, where the academic-practitioner network *La Red* has long worked collectively to document and map the scale and distribution of risk and its underlying causes (see Bull-Kamanga et al., 2003, 198; also IFRC, 2010).

The distribution of risk

It is widely recognised that urban disaster risk is unequally distributed both socially and spatially (Pelling, 2003). For instance, the Intergovernmental Panel on Climate Change (IPCC, 2012, 5) concludes that '[i]ndividuals and communities are differentially exposed and vulnerable based on inequalities expressed through levels of wealth and education, disability, and health status, as well as gender, age, class, and other social and cultural characteristics'. While women, infants, children, the elderly, the disabled and those suffering from ill health are generally cited as most vulnerable, the specific forms

that vulnerability takes in relation to a given type of hazard remain poorly understood. What is clear from the literature on environmental health is how risk and the relative importance of hazards change at different ages and stages of life (Satterthwaite et al., 1996) and how gender and class are significant variables in determining who within an urban population is most at risk (Hardoy, Mitlin and Satterthwaite, 2001).

It is also widely acknowledged that those who are most vulnerable to environmental hazards, disasters and climate change are those who typically live in poor quality housing in low-income informal settlements that lack provision for basic infrastructure and services (Hardoy, Mitlin and Satterthwaite, 2001; Dodman et al., 2013; Satterthwaite et al., 2007; UN-Habitat, 2011; IFRC, 2010; UNISDR, 2009; 2011; World Bank, 2010). It is not uncommon for at least half of the population of cities in Africa to live in informal settlements, many of which are situated in hazard-prone areas (Hardoy, Mitlin and Satterthwaite, 2001; UNISDR, 2009; IFRC, 2010). If we consider someone living in an informal settlement lacking basic infrastructure and services, there are obvious risks for ill health, injury or premature death (and these in turn usually mean additional risks in terms of additional costs or lost income) (Hardoy, Mitlin and Satterthwaite, 2001). There are the everyday risks – for instance related to unsafe and insufficient water, inadequate provision for sanitation and smoke-filled homes from the use of dirty fuels. Stoves used within the home may also pose fire risks and risks for occupants of burns and scalds – particularly problematic when there are high levels of overcrowding and children (Satterthwaite et al., 1996). If there is no electricity, the use of candles and kerosene lights greatly increase risks of accidental fires – with risks further compounded if houses are made of flammable materials and the settlement is dense with no roads that can act as fire breaks.

Given the importance of addressing *who* is at risk coupled with our limited understanding of the distribution of risk in urban centres of Africa, it is important for new research to explore and examine how risk and vulnerability are distributed within the urban population, with a particular focus on low-income groups (or other groups defined or considered ‘poor’) and on differentials related to particular types of settlements (especially informal settlements or other settlements where low-income groups are concentrated) and to age and gender.

Risk accumulation

The need to integrate an understanding of disasters and urbanisation has long been recognised in Africa (Bull-Kamaga et al., 2003; Broto, 2014) and is gaining increasing attention (Simon, 2014) as the impacts of rapid urbanisation, disasters and climate change continue to converge in urban centres (IFRC, 2010; UNISDR, 2009; World Bank and GFDRR, 2010). Although Africa remains the least urbanised continent in the world, it is the second most rapidly urbanising continent, following Asia (UNDESA,

2012). In particular, the urban population in Sub-Saharan Africa is estimated to increase from 36.3 per cent (or 289 million people) in 2000 to 56.5 per cent (or 1.069 billion people) by 2050, with the urban population coming to exceed the rural population around 2032 (UNDESA, 2012). Potts (2009) urges caution in using such projections because of the lack of reliable census data to show current urban trends – and Africa may urbanise slower than these projections suggest. But many urban centres in Africa have and will continue to have rapid population growth (albeit at different rates depending on the economic base and on rates of natural increase).

Urbanisation in Africa, however, should not be characterised as a problem. Rather, the way in which urban growth and expansion are planned and managed is what largely determines the extent and distribution of risk (Hardoy, Mitlin and Satterthwaite, 2001). For instance, the development of unsafe land can increase the exposure of vulnerable urban populations in the absence of protective infrastructure and services and without resistant building codes and standards (Burby, 1998; Johnson, 2011). Other forms of urban change that result in landscape modifications can increase risk through, for example, the introduction of hard-surface cover, which can increase localised flood risk in areas that lack adequate drainage systems (Lavell, 2001). This is particularly problematic considering that governments at all levels in Africa are often unwilling to provide drainage systems (as well as other forms of basic infrastructure and services) in informal settlements, ‘which are often regarded as being outside accepted urban regulation and planning systems’ (Douglas et al., 2008, 191). Moreover, most planning policies and building regulations are anti-poor in that the standards they require effectively price low-income groups out of formal land markets. This often means forcing them to occupy unsafe land, usually in peri-urban areas to avoid detection by, or conflict with, urban authorities (Watson, 2009).

The process of risk accumulation that has emerged in the absence of effective and socially just urban planning and management reflects a failure of local governance – a view that is now widely shared in the literature (IFRC, 2010, Satterthwaite, 2011). Following others (Cannon, 2000; Wisner et al., 2003), this view sees disasters as ‘un-natural’ events that are (re)produced and intensified by the process of risk accumulation and its underlying economic (e.g., urbanisation of poverty), social (e.g., socio-spatial fragmentation), political (e.g., limited democratisation and decentralisation), institutional (e.g., limited institutional capacity) and fiscal (e.g., investments in buildings and infrastructure in hazard-prone areas) dimensions.

Many of these dimensions also underpin risk accumulation processes associated with everyday hazards, including conflict and violence. While there is little evidence that links the likelihood of social unrest and violence to urbanisation per se, Fox and Beall (2012, 968) highlight that ‘in recent decades Africa has experienced exceptional rates of urban population growth in a context of economic stagnation and poor governance, producing conditions conducive to social unrest and violence’. Of partic-

ular relevance to this research are their suggestions for improving urban security by addressing the underlying risk, including urban poverty, inequality and fragile political institutions. Fox and Beall (2012) suggest that these factors must be addressed through the development of stronger urban governance supported by more effective local governments, and by a greater focus on addressing the complex political dynamics that render urban planning and management ineffective.

Research will therefore need to develop a better understanding of the underlying and overlapping factors that drive the accumulation of risk across the continuum, and seek to generate policy-relevant evidence that can be used to inform integrated risk reduction strategies. This requires a focus on the institutions that shape organisational and individual behaviour and scope for action in the city. Historical lenses can help to reveal risk and loss as an outcome of ongoing interaction between different urban interests – interests that sometimes exert influence on the city through formal legislation and policy but also through informal mechanisms or outside the purview of state and government institutions. Local government, large private-sector interests and civil society groups are all active in shaping the city and its risks, and are influenced in turn by actors operating above and beyond the city in national and adjacent rural spaces including those shaping conflict and rural decline or growth.

Climate change and risk

The direct and indirect impacts of climate change are intensifying or likely to be intensifying a range of existing risks related to environmental health and disaster hazards and creating new risks (IPCC, 2007; Wilby, 2007; Satterthwaite, 2011; Revi et al., 2014). While the impacts of climate change are, and for the immediate future will continue to be, highly localised, the nature and scale of climate risk in urban centres across Africa is largely unknown due to a dearth of relevant local data and local analysis (IPCC, 2007; Kithiia, 2011).

The use of downscaled climate models is becoming common practice for assessing expected climate impacts at the city level and for informing urban adaptation strategies. However, very few regional climate models or empirical downscaling exist in Africa (Ziervogel and Zermoglio, 2009; Parnell and Walawege, 2011). There is also a growing recognition within the literature on community-driven disaster risk reduction and climate change adaptation in urban areas of the importance of drawing on the knowledge and experience of communities in coping with climatic variability and change, and in informing locally appropriate adaptation strategies (see Moser and Stein, 2011; van Aalst et al., 2008). New research will therefore need to place attention on the importance of understanding how urbanisation processes influence risk and the importance of knowledge co-production involving the consideration of scientific and community-based information.

Local capacity to act

In urban contexts, much of the responsibility for risk-reducing infrastructure and services falls to local governments which play a critical role in (disaster) risk reduction, as demonstrated by the United Nations International Strategy for Disaster Reduction (UNISDR) *My City is Getting Ready!* campaign (UNISDR, 2012). Local governments are responsible for providing basic infrastructure and services, urban planning and management (including the design and enforcement of building codes and standards) and issuing building permits, all of which seek to ensure the development of safe and resilient settlements (Burby, 1998; Johnson, 2011).

However, the ability of local governments to reduce risk through effective planning in many low- and middle-income countries is widely lacking due to their limited power and resources and often ambivalent relationship with the poorest and most vulnerable groups (Satterthwaite et al., 2007; Satterthwaite, 2011). While the reasons why local governments and their planning systems are ineffective in post-colonial African cities are well documented (ACC, 2010; Gandy, 2006; Harrison, 2006; Mamdani, 1996; Myers, 2011; UN-Habitat, 2009; 2010; Watson, 2009), good practices in urban planning and governance in reducing risk are not. There is a need for the documentation of work where city governments have partnered with local populations and civil society organisations to reduce risk and build resilience to extreme weather. The ongoing work with national federations of Slum/Shack Dwellers International (SDI), active in 15 countries in Africa (see Mitlin, 2012), is a particularly valuable opportunity providing an entry point to gain insights into how the process of community-driven 'slum' upgrading as a form of co-production (Mitlin, 2008) can reduce risk while contributing to broader societal transformation within the context of urban poverty reduction (Pelling, 2011; Satterthwaite and Mitlin, 2014).

Addressing the gaps

One of the biggest challenges is the need to develop a more accurate and credible basis for defining and ranking key urban risks and vulnerabilities. Methods are needed that can highlight where and how risks identified vary by settlement (especially in informal settlements) and that can provide data disaggregated by age and sex. A systematic, disaggregated approach requires addressing the lack of disaster databases currently maintained, particularly regarding extensive risk. A 57-country review of disaster databases (UNDP, 2013) found only five across the African continent – in Ethiopia, Kenya, Mali, Morocco and Mozambique. The lack of data standardisation continues to be a barrier for data comparability and aggregation, although the DesInventar methodology (see Bull-Kamanga et al., 2003), which offers a framework to systematise and analyse local event reports, is beginning to address this, including in Africa.

Responding to the research agenda outlined in this paper and the ethos of science-policy co-production is the goal of a new DFID-ESRC-supported programme of research – Urban Africa: Risk and Capacity (Urban ARC), led by King’s College London. The programme brings together five teams from Sub-Saharan Africa (Abdou Moumouni University, University of Ibadan, the African Population and Health Research Centre, Mzuzu University and University of Cape Town) and two UK-based universities (King’s College London and University College London) with five practice-based organisations (ARUP, the International Institute for Environment and Development, UN-Habitat, Save the Children and International Alert). The programme aims to describe the changing nature, scale and distribution of risk as a basis for projecting and anticipating future changes in risk so that city governments – and the local communities and civil society organisations they do or could work with – can more effectively reduce risk and manage uncertainty. This is only one initiative and follows in the footsteps of others, including African urban disaster risk research and training networks such as PeriPeriU and recent collaborative research projects such as the European Commission-funded Climate Change and Urban Vulnerability in Africa project (<http://www.cluva.eu/>). Africa’s urban risk agenda is wide and growing and must build professional and research capacity, as well as place local capacity and awareness central, as it evolves. If this is supported through collaboration within the Urban ARC programme a small achievement will be made.

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