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The full spectrum of risk in urban centres: changing perceptions, changing priorities

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I. INTRODUCTION

In many urban centres in the global South, there is little or no information on either the scale or the causes of premature death, serious injury, illness or impoverishment. In sub-Saharan Africa, this is the case for most urban centres. Even where there may be some information, it is seldom available for every district in the city. We get some sense of the scale of these issues from household surveys (such as the Demographic and Health Surveys), which show very high infant, child and maternal mortality rates "for urban areas" in many African and Asian nations.(1) But for practical action this kind of information is needed for every ward or district – on what the problems are, where they are and who is most impacted. Civil servants, politicians and civil society groups working at neighbourhood, ward, district and city levels may have some sense, based on their experience, of what the concerns are within their jurisdictions. But without data to present to higher-ups, it can be difficult to get proper action in response. The availability of data is worst of all for informal settlements – despite the fact that they often house more than half of a city's population. In Nairobi, the African Population and Health Research Center (APHRC) has shown that aggregate figures for infant and under-5 mortality rates for the city hide the much higher rates in informal settlements.(2) But this kind of information is needed everywhere, and there is in general scant documentation of the serious risks faced by the billion or so urban dwellers who live in informal settlements.

The Intergovernmental Panel on Climate Change's Fifth Assessment defines risk as

> "The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure and hazard."(3)

This special issue of *Environment and Urbanization* is on the full spectrum of risk in urban areas – on all the potential and likely causes of events resulting in premature death, illness or injury, and impoverishment. But we have to start by admitting how little we know about the hazards facing much of the world's urban population, and thus also how little we know about the most serious risks. Data on disasters for cities (including the number of deaths) are much better, at least for the "big" disasters that are recorded, although here too it is difficult to get data for each urban centre that is impacted. But data on disasters seldom include attention to the "small" disasters that are the cause of so much premature death, injury and impoverishment. The recognition that these "small" disasters were not being recorded in the global disaster databases led to studies of particular cities that drew on local data sources to give a much more complete picture. The paper by Ibidun O Adelekan(4) in the next issue, for example, does this for Ibadan, Nigeria, picking up on deaths and sometimes injuries from physical hazards that are not recorded in disaster databases. These provide a more complete picture for Ibadan and for each local government area within the city. But even here, it is clear how many challenges are involved in putting together a complete picture based on the available data.

"Understanding the full spectrum of risk in urban areas" means understanding all the risks that can impoverish or otherwise injure, sicken or kill urban populations. If we unpack this, we can see that it also means understanding the probability of hazardous events occurring (whether catching an infectious disease or an extreme weather event), the likely consequences for vulnerable groups, and the actual outcomes of past risks.

But there are so many different risks, each with particular impacts on health or incomes, assets and/or livelihoods. There is also the wide spectrum of hazards and hazard classifications, and the wide spectrum of vulnerable urban groups, residents and workers, that may be especially susceptible to particular hazards, or less able to cope with or avoid them. Infants and young children, for example, are so vulnerable to diarrhoea from contaminated food or water. Out of this comes the need to determine who faces the greatest life- and health-threatening risks from each of the three

categories of (large) disasters, small disasters and everyday hazards – whether in their homes, at work, in their neighbourhoods or in the wider city. All of this is necessary to provide the basis for investing in what can be termed "risk-reducing" infrastructure, services and (as explained later) land-use management.

For those working on urban issues in the global South, there has been a recognition at least since the early 1980s that a growing proportion of the urban population lived in informal settlements on land sites at high risk from floods and/or landslides. This led to an interest in disaster-related risks – and to learning from the disaster risk specialists who at that time were looking in depth at all the "small and localised disaster events" in particular cities, showing that so many of these, with their huge cumulative impacts, were not included in global datasets on disasters.[5] In urban areas, the impacts of many of these "small" disasters were concentrated in informal settlements. Urban development specialists began to draw on the work and methods of disaster risk specialists and to wonder where what might be termed "everyday risk" would fit into this classification of risk.[6] Everyday risks are the kinds of risks that vulnerable groups are constantly exposed to in their homes, workplaces and the wider city, including a wide range of disease-causing agents or their vectors (as in dengue and malaria), chemical pollutants (including indoor and outdoor air pollution) and physical hazards (including burns, cuts, scalds, traffic accidents and violence).Wondering about where these kinds of risks fit in generated some questions: What is the difference between an everyday risk and a disaster risk? When does an "everyday risk" become a "disaster risk"? And how does the sum of all the everyday risks influence the capacity of individuals and households to cope with and adapt to disasters?[7]

More recently, there has been the challenge of trying to understand the changes in hazards and exposure to hazards that climate change is bringing, will bring or might bring. This will include small and large disasters as well as the deaths, injuries, illnesses and losses that are not considered disasters. And even more recently,[8] a focus on understanding the health issues facing those living in informal settlements, and the scale and nature there of premature death, illness and injury,[9] has heightened the interest in everyday risks, as well as in small and large disaster risks. There has long been a recognition of the importance of land-use management in and around cities for disaster risk reduction, especially around reducing flood risk. Now, risk-reducing land-use management must be added to risk-reducing infrastructure and services as a key responsibility of urban governments.

II. VULNERABLE GROUPS

An individual or household is said to be vulnerable to a hazard if they are more susceptible to being harmed or killed and/or to livelihood, income or asset loss and if they have less capacity to cope and adapt. So if the hazard to which they are vulnerable is removed, they are not vulnerable. It is now obligatory within UN declarations, discussions and recommendations to make special mention of "vulnerable groups" and then often to list them – as in the Sustainable Development Goals (SDGs) and the so-called New Urban Agenda. But rarely do the UN texts go beyond these lists to ask why these are vulnerable groups and what is needed to reduce or manage their vulnerability. It is not so much vulnerable groups that are at issue, but particular groups that are vulnerable to specific risks; remove the hazard and they are no longer at risk.

Of course, for this issue of *Environment and Urbanization*, the interest is in reducing or removing the risk. Provision to people's homes of safe, sufficient, regular, affordable water and sanitation and an effective, easily accessed health care system enormously reduce the risks of premature death and ill health; there is no "vulnerable group" if the risk that they are vulnerable to is removed. We also see this in disaster risk reduction that reduces or removes flood risks.

The paper by Adriana Allen, Linda Zilbert Soto and Julia Wesely, in collaboration with Teresa Belkow, Vladimir Ferro, Rita Lambert, Ian Langdown and Amaru Samanamú,[10] has a particular interest in vulnerability. In its study of two settlements in Lima – Barrios Altos, in the historic centre, and José Carlos Mariátegui, on the periphery of metropolitan Lima – levels of vulnerability and risk are highly heterogeneous, even amongst those living in the same area. So many factors like gender, socioeconomic dependency ratio, level of income, location and history of the settlement explain individual and household vulnerability. Place-based policies and programmes need

to respond to context-specific characteristics, thus identifying who is vulnerable, where they live, what kind of hazards they are vulnerable to and why – and what capacity they have to act.

III. UNDERSTANDING THE FULL SPECTRUM OF RISK

a. Defining and measuring risks

Making sense of all the causes of risks and their health outcomes in any urban centre or settlement within an urban centre has to consider so many factors – from global to national to local, from economic to social and political. These are often discussed within the literature on the "social determinants" of health even though many of the determinants are actually economic or political. The risks of loss of property and assets can also be caused by a range of factors. Similarly, within each urban centre or settlement, there is a usually a long list of hazards as well as a large spectrum of vulnerable groups.

It is possible to consider "everyday" risks, risks from small and large disasters, and climate change impacts using the same metrics – premature death, illness and injury, damage to or destruction of homes and assets. Everything that has impoverished, harmed or killed an individual or individuals in a city can in theory be documented. This evidence can guide policy and implementation, especially for the city or municipal governments that are responsible for providing most risk-reducing infrastructure (like safe, sufficient, affordable water; good-quality sanitation and electricity; all-weather access roads; and street lighting) and risk-reducing services (including health care, emergency services, rule of law and schools).

The United Nations Office for Disaster Risk Reduction (UNISDR) makes the distinction between "intensive disasters" and "extensive disasters". Intensive disasters are the high-intensity events associated with major hazards, and they are currently defined to include the events where at least 30 persons are killed and/or at least 600 houses are destroyed. Extensive disasters (also called small disasters) are those with impacts below these two thresholds. There is no such clear line between the outcomes of everyday risk and the smallest small disasters, however. Is one death from a flood a small disaster? What about a three-year-old's death from an acute respiratory infection? Perhaps this is why UNISDR has defined no lower limit for the number of persons killed in extensive risk.

Drawing on data from over 80 countries, UNISDR analyses show the importance of attention to extensive disaster risk both in terms of impact (e.g. mortality, injury and economic losses) and in terms of what drives it. What remains unclear is exactly which premature deaths extensive risk covers. The flood that kills one person *may* be included, but the infection that kills the three-year-old child is not. Premature deaths from physical hazards (such as traffic accidents, fires, floods, crime) usually get picked up in analyses of small disasters, but not premature death from diseases. However, while endemic infectious and parasitic diseases count as everyday risks, epidemics would be classified as disasters. It can be confusing to broaden the discussion of large and small disaster risks to include everyday risks, but as this editorial seeks to highlight, it changes the way that risk is understood and measured.

Distinctions between different categories of risk are based not only on the scale of their potential impact but on the frequency of their outcomes. Small disasters usually have a higher frequency than large disasters – seasonal flooding for instance. In some cities, however, large disasters have also become more frequent in recent decades. Everyday risks are distinct in the sense that they are present in homes, neighbourhoods and the wider city and pose a constant "everyday" threat to residents. So heavy rainfall or heatwaves would not be included, but contaminated water sources would be, at least among those households that lack either the knowledge or capacity to treat this water.

Not every risk fits easily into the above categories. For instance, indoor and outdoor air pollution are *not* considered disasters although their contribution to premature death in many highly polluted cities might meet the criteria set for a disaster, especially for particular periods when air pollution levels are very high.

b. Papers assessing risks and their outcomes

Most papers in this issue on risk are on just part of the risk spectrum. Despite the encouragement to authors to submit papers on the entire spectrum of risk, from everyday and small-scale to large-scale, most of these papers focus on a part of the spectrum. It is worth considering why this is the case. Perhaps it is because of the difficulties in documenting health risks. There is a substantial literature on risk in relation to livelihoods and to disasters but far less on everyday (mostly preventable) health burdens. There is a growing literature on climate change risk. But there has been far too little attention in this context to understanding the full range of risks facing low-income women, men and children and their relative importance with regard to premature death, illness, injury and impoverishment. Within this uneven literature, little attention has been given to the health risks and resulting health burdens faced by those who live in informal settlements and the implications for their employment, incomes and school attendance.[11] It is in the cumulative impact of all these events that we see the devastating effects.

Papers on multiple risks

The paper by Mtafu Manda and Elijah Wanda on Karonga, Malawi is unusual in that it reports on data collected on all risks for the whole city. This was possible because Karonga is still a relatively small city; its population is less than a quarter of that in the informal settlement Kibera (in Nairobi), which is the focus of one other paper in this issue (and one in the next issue). Drawing on responses from households and selected informant interviews and data collected from hospital records, the paper shows the range of causes of premature death, injury and asset loss for the inhabitants of Karonga. It highlights the fact that the impacts of what could be termed everyday risks include more premature deaths than those from disasters. Records from Karonga District Hospital show 67 tuberculosis (TB)-related deaths and 32 respiratory disease-related deaths (probably mostly infant and young children) in 2014, much higher than the casualties from flooding. Of course, as the authors of this paper point out, these "events" are very different in character – flooding would also bring the risk of damage to property and assets and perhaps secondary impacts (for instance, the high risk of a cholera outbreak). The paper also points to other causes of premature death (including traffic accidents, drought, drowning, animal attacks and cholera) and injury (politically linked violence, gender-based violence).

The paper on Ibadan by Ibidun O Adelekan, mentioned above, also reports on a wide range of risks and in some cases their concentration within and around the city. This paper draws on the DesInventar methodology[12] and on reviews of newspaper reports from the *Nigerian Tribune* (whose headquarters are in Ibadan), and it covers the period from 2000 to 2015 for details of events that resulted in death. This means it picks up many events that would not be considered as disasters – and it finds that the highest number of deaths come from motor vehicle accidents, crime and violence. These are followed by fires and floods, some of which would be classified as disasters. But we also need to recognize how much this newspaper does not report on. A cholera epidemic, for instance, would get coverage, but not each example of infant, child or maternal mortality would.

What the paper on Ibadan shows so dramatically is the lack of funding and capacity within the many local government areas that make up Ibadan that would allow their officials to fulfil their many responsibilities for providing risk-reducing infrastructure, services and land-use management. The paper examines the social, economic and political structures at the national, city and local levels that produce the most serious urban hazards in the city and how they drive the process of risk accumulation. There are also the many difficulties around coordination among the different local governments, the state government and the federal government. There are large and growing deficits in provision for water (municipal water supplies reach only 35 per cent of the population), sanitation (there are no sewers), solid waste collection (most households have no regular collection and most waste is dumped in drainage channels, unapproved dump sites and wetlands), roads (a high proportion of houses are not accessible by tarred road) and public transport. Most households have electricity from the grid but supplies are irregular. In regard to reports of deaths from flooding between 2000 and 2013, almost all deaths were in the years 2010–2013 – and especially 2011, from a flood that was reported to have killed over 100 persons. The fact that violence and other crimes feature as leading causes of premature death also suggests deficiencies in policing and in the rule of law. What Adelekan's paper shows so vividly is a large, important, rapidly growing city where local governments are seriously constrained by the inadequacy of funding from state and federal

government. These constraints have gotten worse – see the dramatic fall in funding for social services, the rapid increase in debt and the non-payment of civil servants' salaries. Here, the greatest driver of risk, whether for disaster, small disaster or the outcomes of everyday risk, is the inability of local government to meet its responsibilities.

The paper on Ibadan also highlights how important land-use management is for risk reduction. Most urban development in and around Ibadan has taken place without compliance with building guidelines on plot coverage, setback stipulations, building standards and the change of use (from wholly residential to the incorporation of commercial and home-based enterprises). In regard to flooding, 26,533 buildings are within the minimum riparian setbacks on either side of watercourses set by government.

The paper by Adriana Allen and co-authors[13] examines the risk-mitigating investments and efforts undertaken by state agencies and by local residents and communities in two settlements in Lima. The research included an in-depth participatory analysis of who is most affected by a wide spectrum of small-scale and everyday risks and how, where and why. It also considered local dwellers' and state agencies' capacity to act to address risk accumulation.

Papers on single risks – although with multiple factors and outcomes

The paper by Soumana Boubacar, Mark Pelling, Alejandro Barcena and Raphaëlla Montandon focuses on one risk – flooding – and on the absorptive capacity of low-income households living in flood-prone neighbourhoods in Niamey, Niger in the context of a flood in 2015. Three hundred household heads in houses that had been flooded were interviewed about the changes they had experienced as a result in regard to shelter, security, education, food, economic assets, health and social support. So rather than focus on the full spectrum of risk, the paper focuses on the wide spectrum of factors that contributed to the outcomes of one particular risk. Each household's resilience was calculated and each household was placed in one of four resilience classes: very low, low, moderate and high resilience.

Across the sample, respondents reported similar hazard exposure – six to eight days of household flooding – but there were stark differences in the number of days respondents reported having to live outside their dwelling because flooding made it uninhabitable. For the moderate and high resilience classes, no relocation was reported, while for the very low and low resilience classes, mean periods spent away from home were 15 and 19 days respectively.

The paper by Sani Limthongsakul, Vilas Nitivattananon and Sigit Dwiananto Arifwidodo also focuses on one risk (flooding), but it provides a lot of detail and insight into what might be called a wide spectrum of causes. The paper presents a case study of a settlement in Bangkok's rapidly developing urban fringe, where local residents have been experiencing localized flooding after normal rainfall. For many households, flooding has become more of an everyday hazard than a disaster as it can occur over an extended period (from three to six months) or many times a year. Mostly it results in just a shallow layer of standing water, but enough to create difficulty in getting around and to present serious health concerns as foul-smelling stagnant floodwaters quickly become pathogen-contaminated areas and mosquito breeding grounds. Some households have abandoned their homes. Government agencies are not addressing the drivers of this localized flooding – the rapid increase in the extent of the impervious surfaces, violation of laws on land use, absent or malfunctioning drainage infrastructure in both private developments and public roads, and a lack of coordination between public agencies around public infrastructure development.

The paper by Anindrya Nastiti, Barti Setiani Muntalif, Dwina Roosmini, Arief Sudradjat, S V Meijerink and A J M Smits explores the daily risks facing households in a peri-urban district of Bandung, Indonesia in regard to inadequate water access and supply (quality, quantity, continuity and affordability). The authors describe how the absence of an adequate centralized water supply shifts responsibility to households for obtaining safe and reliable water. They also look at measures households took to avoid risk – for instance boiling, filtration, chlorine application, or ultraviolet disinfection. Some households responded to inadequate provision by constructing expensive storage tanks that provide reserves of tap water or rainwater. When no other option is available, buying water from small-scale enterprises becomes a last resort. One of the paper's conclusions is that attention

also needs to be given to community-level responses, as households may reduce the effect of a poor-quality water supply by acting jointly with others in their neighbourhood.

The paper by Tilahun Nigatu Haregu, Abdhalah K Ziraba, Isabella Aboderin, Dickson Amugsi, Kanyiva Muindi and Blessing Mberu[14] focuses similarly on a hazard related to service provision – the inadequacies in solid waste management in Nairobi and Mombasa. But what this demonstrates is how many risks this ends up generating – for residents without regular collection, for those living close to open dumps, and for many of those whose livelihoods are based on solid waste recovery and recycling. What this also documents is the fact that these very poor results prevail despite the large and impressive number of national and local laws, regulations and policies on all aspects of solid waste management. The situation is deteriorating rather than improving. Until the mid-1970s, over 90 per cent of the waste was being collected in Nairobi; in 2010, it was down to 30 per cent.

IV. WHAT RISKS GET RECORDED AND REPORTED

We understand risk from records of past risk events – so our understanding is influenced by the risk events that have been noticed and recorded. How would government and international agency responses to disaster impacts and losses change if everyday risks were included?

DesInventar is a conceptual and methodological tool that is used for constructing databases on the impacts of disasters.[15] By widening the definition of a disaster and tapping new information sources (including reports in local newspapers) it has changed the picture of risk. But as indicated in the discussion of the Ibadan paper, it does not pick up on individuals who die prematurely from diseases – except for epidemics – so most infant, child and maternal deaths are not counted. This is critical because the issue of disease remains acute in many countries. Some physical hazards may be included (traffic accidents) while others are not (burns and scalds unless these are from accidental fires that are recorded).

Do hazards that affect middle- and upper-income groups get more attention than those that do not? There has recently been a much increased focus on ambient air pollution in cities (which impacts higher-income groups as well and is relatively easy to measure), but much less focus on diarrhoea and other waterborne and foodborne diseases, both because these are less important for higher-income groups and because their health impacts are difficult to record.

There is also the issue that it is difficult to gather information on health risks from interviews with households. In the Niamey interviews with household heads whose homes had been flooded in the September 2015 flood, interviewees were often unable to report in detail on household members' health problems, let alone judge how these had changed. However, the least resilient households consistently reported higher health burdens, especially linked to malaria episodes. In the household interviews and group discussions in Karonga, many risks were identified but almost all were hazards that might result in physical injury; diseases were not seen as risk outcomes to be highlighted. (But perhaps if there had been accurate data on deaths from infectious and parasitic diseases, it would have changed these discussions.)

V. RESILIENCE

A focus on resilience should make clear the many ways in which risks can be reduced for urban poor groups. This can be seen in the papers that were in the two special issues of *Environment and Urbanization* on resilience, published in 2015.[16] But the term resilience is used by many disciplines within many different contexts. It is being applied to people ("resilient individuals, households or communities"), to the homes and neighbourhoods where they live, to livelihoods, to infrastructure and to larger systems (urban development, cities, city regions or national economies).

Two papers in this issue raise concerns about the current emphasis on resilience for urban development and within this for urban risk management. The paper by Gina Ziervogel, Mark Pelling, Anton Cartwright, Eric Chu, Tanvi Deshpande, Leila Harris, Keith Hyams, Jean Kaunda, Benjamin Klaus, Kavya Michael, Lorena Pasquini, Robyn Pharoah, Lucy Rodina, Di Scott and Patricia Zweig notes that the concept of resilience applied to cities was developed in high-income nations; for cities in the global South, it remains an uncomfortable idea because it supports the status quo through

notions of "bouncing back", and because of its limited ability to address more just, progressive, emancipatory or transformational urban agendas. As this paper and the paper by Maria Kaika point out, contemporary resilience planning for cities has a tendency to push responsibility for risk management from central agencies to individuals and households at risk. This results in a shift in burden from government to citizen, and encourages a mentality of coping with risk, rather than resolving it, which would necessitate addressing the social structures, legal apparatus and administrative practices that produce and distribute vulnerability and risk.

The paper on Niamey focused its discussion on household resilience, not infrastructure resilience. It shows the differences in resilience among households living in flood-prone areas. In the case of 28 per cent of the very low resilience households relying on mud-wall construction, all four boundary walls (walls surrounding a family compound, but not the dwelling walls) collapsed completely. This did not happen for any high or moderate resilience households. High resilience households are also better able to cope with flooding by taking on debt and expending savings. But the worry here is how much savings and loans will be available for the next flood (or for other shocks), even for higher-income households.

The paper by Maria Kaika notes that the new call for *"safe, resilient, sustainable and inclusive cities"* in the Sustainable Development Goals remains path dependent on old methodological tools (e.g. indicators), techno-managerial solutions (e.g. smart cities), and the institutional frameworks of an ecological modernization paradigm that did not work. A focus on resilience can simply transfer responsibility to citizens; it mediates the effects of global socio-environmental inequality, but does little towards alleviating it. The author gives the example of Tracie Washington, President of the Louisiana Justice Institute, who requested that policymakers and the media stop calling Hurricane Katrina and BP oil spill victims "resilient", pointing out that this can become an excuse by governments for not acting on removing the risks.

There is also the issue of connecting resilience to all the SDG commitments addressing inequality, poverty and justice. The paper by Gina Ziervogel and co-authors suggests that a focus on rights and justice can help to ensure that the everyday risks experienced by growing numbers of low-income urban dwellers are not forgotten. This would make uncovering and addressing the structural causes of everyday risk central to resilience. It would also situate resilience as a component of ongoing struggles for pro-poor and progressive development. But a focus on resilience can also ignore everyday risks when the focus is on livelihoods or on resilience to physical hazards, or simply on the resilience of city infrastructure, with little or no concern about the hazards faced by those most at risk.

VI. RESPONSES TO RISKS

Who has to act to reduce each risk? What needs to be done and by whom? One issue raised in this editorial and in many of the papers is that most risk in urban areas cannot be reduced if local governments fail to meet their responsibilities with regard to risk-reducing infrastructure, services and land-use management. It could be argued that the failure of urban governments to meet such responsibilities (and the causes of this, including the lack of support from higher levels of government and international agencies) is the single most important factor in determining the level of most risks. The paper by Adriana Allen and co-authors describes how government policies, programmes and plans for disaster risk management at national, regional and local levels are moving in the right direction (including an increasing budget and a proactive legal and procedural framework). But local authorities lack the budget and the capacity to act effectively on both risk reduction and prevention in the short, medium and long term, or on the underlying structural causes of risk.

In addition, despite significant efforts by local dwellers and public authorities to reduce disaster risk, these rarely combine to prevent the exacerbation of everyday and small disaster risks and the erosion of capacity to act. The importance of including attention to everyday risks can be seen in the inadequacies in provision for water and sanitation. In one of the settlements studied by Allen and co-authors, José Carlos Mariátegui, 60 per cent of the settlers depend on communal water taps and 25 per cent depend on communal latrines. In another settlement, Barrios Altos, 68 per cent of households experienced flooding inside their houses frequently, due to blocked or broken pipes. But such "everyday" risks get a low priority in public investments.

There are many good examples of household and community-level coping and adaptation,[17] but these cannot build the city-wide systems needed for risk reduction. In addition, autonomous adaptation at any scale tends to involve distributing risks to others, as illustrated by the paper by Sani Limthongsakul, Vilas Nitivattananon and Sigit Dwiananto Arifwidodo. In the settlement they describe on the periphery of Bangkok, for all the reasons described above, a lack of proper drainage and uncoordinated development in the absence of attention to regulations leads to standing water that creates numerous problems for health and mobility. The paper documents in detail the positive and negative impacts of autonomous adaptation measures undertaken by households, communities and the private sector, which tend to involve passing risks on to others, as excess water is drained onto public road surfaces or towards other open spaces nearby.

In Lima, residents in low-income areas have an enormous capacity to manage and invest in building their lives in the city. However, as the paper by Adriana Allen and co-authors shows, policies that promote individualized interventions do not respond to the underlying structural causes of risk cycles. This calls for more collective and participatory efforts that include the knowledge and resources of ordinary citizens and public actors. In José Carlos Mariátegui, getting a plot was cheap but a much larger investment is needed to make steep slopes habitable. This would include flattening the land, getting access to potable water, improving accessibility and coping with the multiple everyday risks.

In what are now classified as high-income countries, and in some upper-middle income countries, governments have dramatically reduced most of the life- and health-threatening risks in the homes and neighbourhoods of almost all urban dwellers and workers through provision of risk-reducing infrastructure, services and land-use management. This has also dramatically reduced disaster risk. But in most cases, this required well-functioning city and municipal governments and strong citizen and civil society pressure, including organizations and movements of the urban poor that demanded attention to their risks. Cities in these countries also had the information base on risks that they needed, through censuses, vital registration systems, hospital records and other monitoring systems. Better reporting on road accidents, for instance, has led in many places to concerted action and a reduction in death and injury rates.

The papers by Gina Ziervogel and co-authors and Adriana Allen and co-authors highlight the importance of local processes and local knowledge in identifying and acting on risk. In the paper by Shreya Mitra, Joe Mulligan, Janpeter Schilling, Jamilla Harper, Janani Vivekananda and Lisa Krause, a comparison of three initiatives in Kibera shows the risks to "beneficiaries" of poorly designed and managed government policies and projects – as in the case of the Kenya Slum Upgrading Programme (KENSUP) project. A resettlement programme rehousing those living too close to the railway track produced far more benefits and far less risk, in part because, unlike KENSUP, it involved residents and their organizations (especially the Kenyan slum dwellers federation, Muungano Wa Wanavijiji[18]) in the planning and implementation and secured community buy-in. The third initiative described, support for the National Youth Service, worked well while it lasted by supporting upgrading initiatives and income-earning opportunities for youth, and the paper suggests that this included a drop in crime. But when the funding was no longer there, many youth went back to crime. This paper concludes that slum upgrading projects in particular, and by extension, development projects in general, can become a tool for strengthening resilience to risks such as flooding, conflict and security through building trust – both horizontal, between communities, and vertical, between communities and governance providers.

VII. CONCLUSIONS

So among all the hazards, all the vulnerable groups and all the risks identified in the papers, and all the factors that cause or influence these, what needs highlighting? The first is the huge scale of premature death, illness, injury and impoverishment that remains hidden because these are not recorded and not even seen as outcomes of risk by many actors. The second is how much effective risk reduction depends on the quality and capacity of local governments, including their capacity to listen to and work with those most at risk.

Risks that are not counted: Perhaps one of the most important points to take away from this collection of papers is what most of them do not cover (or at least do not cover in detail). This is the

risk faced in each district or settlement by urban dwellers, or particular groups of urban dwellers, of premature death or serious impairment by illness from infectious and parasitic diseases. In the informal settlements in each city, the focus of several papers, certain infectious and parasitic diseases will almost certainly figure among the largest risks of premature death or impairment from illness. It is also likely in many of the cities covered in the papers on risk that particular infectious and parasitic diseases are the highest risk for entire city populations – but with considerable differences in the scale of the risk by district and by income group. It is likely that infant, child and maternal deaths represent a very high proportion of all premature deaths, concentrated in settlements where provision for risk-reducing infrastructure and services is worst.

A more complete picture: Getting a more complete picture for any urban centre of the full spectrum of risks, and who is most at risk and why (and where they live), is a key underpinning for more effective action. This should also highlight where risk reduction is needed and is possible. For those residents served by risk-reducing infrastructure, services and land-use management, many of the most common causes of premature death disappear – including infant and child deaths from diarrhoea and acute respiratory infections and deaths from extreme weather events. A good health care system should also remove TB and Aids from leading causes of death. Good provision for pedestrians, cyclists and public transport and good traffic management can cut deaths and injuries from road traffic accidents.

Changing perceptions, changing priorities: The papers also highlight the extent of the responsibility for risk-reducing infrastructure, services and land-use management that falls to local (urban) governments. Why is it that higher levels of government and international agencies give so little attention to this? Why is there so little funding for effective city-wide provision for water, sanitation, drainage and solid waste removal? Why are the data needed on risk and its causes not available for each urban centre and its districts, wards and neighbourhoods? Why do we know so much about the global burden of disease but so little about the burden of disease in each locality (which is where the data are actually needed to guide action)?

Information: All urban centres need an information base on the main causes of premature death (perhaps especially for infants, children, youth and mothers), serious illness, injury and impoverishment that can be made available for each small area (or if possible each street) and that can be mapped to show where each risk is concentrated. Census data should be seen as a public good, with census authorities providing local governments with data on conditions in their jurisdiction, down to each street. This should also be the case for vital registration systems that provide data on deaths, causes, age and location. These should be available not only to local governments but also to citizens and civil society groups, but of course with census data also guaranteeing the anonymity of respondents.

Where these formal systems do not exist or where it is not possible to obtain such information from them, then new locally rooted measures are needed. Some of the papers in the next issue show the power of the DesInventar method – but also its limitations (for instance not being able to include most premature deaths and illnesses). All papers show the details and insights their authors got from engaging with local populations – whether through household surveys, focus groups, selected informants or, for some risks, official records from police and hospitals. Then there are the detailed surveys and maps of informal settlements undertaken in hundreds of cities by slum/shack dweller federations. These provide much of the data needed to inform risk reduction and engage local populations in setting priorities.[19]

National and international support for local and urban action: We need international agencies to recognize the need to support local action on the part of local governments, local universities and local civil society organizations, as they work on how to assess the most serious risks (everyday, small and large, frequent and infrequent) facing the inhabitants in each settlement. There is a lot these international agencies can do – help these local groups to access all available relevant data from different government agencies at each level; make national statistical offices and census bureaus learn to serve and support local governments and other local groups with the data they require in a useful form; learn to support co-production between local governments and groups at risk;[20] and develop a capacity to help fund and support a range of initiatives in each locality, including civil society initiatives.[21]

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[5] See for instance http://www.cred.be/.

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[8] This is not really a new concern; the World Health Organization (WHO) in the 1980s had a special programme looking at urban health issues in the global South and a strong interest in public and environmental health. See for instance the initial support for the Healthy Cities programme to be extended to the global South and the following report: WHO (1992), *Our Planet, Our Health*, Report of the WHO Commission on Health and Environment, World Health Organization, Geneva, 282 pages. But this interest was not sustained.

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[10] See reference 7, Allen et al. (2017).

[11] See papers listed in reference 9.

[12] http://www.desinventar.org/en/desinventar.html.

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[15] For more details, see the work of La Red and http://www.desinventar.org/en/desinventar.html; also http://www.desenredando.org/.

[16] See the special issues of *Environment and Urbanization* on "Towards resilience and transformation for cities" (Vol 25, No 2 and Vol 26, No 1); also see Chelleri, Lorenzo, James J Waters, Marta Olazabal and Guido Minucci (2015), "Resilience trade-offs: addressing multiple scales and temporal aspects of urban resilience", *Environment and Urbanization* Vol 27, No 1, pages 181–198.

[17] See for instance Stephens, Carolyn, Rajesh Patnaik and Simon Lewin (1996), *This is My Beautiful Home: Risk Perceptions towards Flooding and Environment in Low Income Urban Communities: A Case Study in Indore, India*, London School of Hygiene and Tropical Medicine, London, 51 pages; Douglas, Ian, Kurshid Alam, MaryAnne Maghenda, Yasmin Mcdonnell, Louise McLean and Jack Campbell (2008), "Climate change, flooding and the urban poor in Africa", *Environment and Urbanization* Vol 20, No 1, pages 187–205; Jabeen, Huraera, Adriana Allen and Cassidy Johnson (2010), "Built-in resilience: learning from grassroots coping strategies to climate variability", *Environment and Urbanization* Vol 22, No 2, pages 415–431; Odemerho, Francis (2015), "Building climate change resilience through bottom-up adaptation to flood risk in Warri, Nigeria", *Environment and Urbanization* Vol 27, No 1, pages 139–160; Kiunsi, Robert (2016), "Dar es Salaam, Tanzania", in Sheridan Bartlett and David Satterthwaite (editors), *Cities on a Finite Planet: Towards Transformative Responses to Climate Change*, Routledge, London, pages 81–95; and Bosco Isunju, John, Christopher Garimoi Orach and Jaco Kemp (2016), "Community-level adaptation to minimize vulnerability and exploit opportunities in Kampala's wetlands", *Environment and Urbanization* Vol 28, No 2, pages 475–494.

[18] For details of Muungano Wa Wanavijiji and its work see Lines, Kate and Jack Makau (2017), "Muungano nguvu yetu (unity is strength): 20 years of the Kenyan federation of slum dwellers", Human Settlements working paper, International Institute for Environment and Development, London, 88 pages, available at http://pubs.iied.org/10807IIED/.

The term "slum" usually has derogatory connotations and can suggest that a settlement needs replacement or can legitimate the eviction of its residents. However, it is a difficult term to avoid for at least three reasons. First, some networks of neighbourhood organizations choose to identify themselves with a positive use of the term, partly to neutralize these negative connotations; one of the most successful is the National Slum Dwellers Federation in India. Second, the only global estimates for housing deficiencies, collected by the United Nations, are for what they term "slums". And third, in some nations, there are advantages for residents of informal settlements if their settlement is recognized officially as a "slum"; indeed, the residents may lobby to get their settlement classified as a "notified slum". Where the term is used in this journal, it refers to settlements characterized by at least some of the following features: a lack of formal recognition on the part of local government of the settlement and its residents; the absence of secure tenure for residents; inadequacies in provision for infrastructure and services; overcrowded and sub-standard dwellings; and location on land less than suitable for occupation. For a discussion of more precise ways to classify the range of housing sub-markets through which those with limited incomes buy, rent or build accommodation, see *Environment and Urbanization* Vol 1, No 2 (1989), available at http://eau.sagepub.com/content/1/2.toc.

[19] For more details of these, see http://www.sdinet.org.

[20] The October 2018 issue of *Environment and Urbanization* will be on "Co-production: taking stock of achievements and possibilities".

[21] The April 2018 issue of *Environment and Urbanization* will be on "Local finance for local development".