Thematic Note
Cross-Cutting Theme: Extensive Risk

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Extensive risks

SUMMARY: The United Nations International Strategy for Disaster Reduction (UNISDR) has led a move to encourage and support governments to greatly improve the accuracy and detail in their records on disasters. One key element of this is the collection of data on 'small' disasters and their impacts that do not get included in national and international disaster databases. UNISDR made the distinction between 'intensive disasters' (currently when 30+persons killed and/or 600+ houses destroyed) and 'extensive disasters' (events recorded as disasters but with impacts below these two thresholds). Drawing data from over 80 countries, UNISDR analyses show the importance of attention to extensive disaster risk both in terms of impact (eg mortality, injury and economic losses) and in terms of what underpins or drives it. What is still unclear is the extent to which extensive risk covers all premature deaths. An important threshold remains separating extensive risk from most everyday hazards that cause premature death or injury – for instance, a flood which kills one person may be included but an infection that kills a three year old child is not. Further, although the UNISDR Global Assessment Reports discuss in some detail disaster loss in urban areas and its underpinnings, the disaster loss data these present are not disaggregated into urban and rural areas.

Urban ARK needs to go further than this in constructing 'local' (not national) disaster loss databases (at the level of particular cities or districts within cities) and to consider and document what risks or small disaster events these are not showing (because their impact is too small, because they are not recorded, because they do not fit into the UNISDR disaster categories). By doing this, we will present detailed pictures of risks for urban areas (or particular settlements within urban areas) and move from describing the extent of losses to generating a better understanding of the drivers of risk. This in turn will mean the research is better positioned to respond to recent calls for more local responses to disasters and other crises.

Introduction

When developing its first global report on Disaster Risk Reduction (United Nations 2009), the UNISDR recognized how the impacts of disasters and the number of people affected were being under-counted (or under-estimated). In part this was because details of many disasters were not being included in the global disaster databases (especially EM-DAT[1]), in part it was because the criteria (or threshold) used by these databases for what constitutes a 'disaster' were set too high. For instance, for a disaster to be included in EM-DAT, at least one of four criteria must be met: ten or more people reported killed; a hundred or more people reported affected; declaration of a state of emergency or a call for international assistance.

This under-counting of disasters and their impacts has long been highlighted by the work of many institutions in Latin America that formed La Red (Network of Social Studies in the Prevention of Disasters in Latin America) as these collected data on disasters that were below the disaster thresholds of EM-DAT and by work in other nations that drew from La Red's findings and methodologies. These also provided examples of disasters that did meet one or more of the EM-DAT criteria that were also not included.

[1] http://www.emdat.be/

Defining intensive and extensive risk

The UNISDR introduced the terms 'intensive risk' and 'extensive risk' to encourage more work on the disasters that were not being recorded – and also as the basis for looking at disaster risks in particular countries, regions within countries or cities in ways that captured the impact of 'small' disasters. When it introduced these two terms, the impact of extensive risk (in terms of mortality, physical damage and economic loss) had not been accounted for in national or international reports – except for a number of Latin American countries.

What UNISDR did was to bring together the studies that showed the scale, nature and spatial distribution of extensive risk and to support similar analyses in other countries. The most recent UNISDR report (United Nations 2015) notes that data on extensive risk have been collected in 82 nations including many in sub-Saharan Africa (for instance Kenya, Madagascar, Mali, Mozambique, Senegal, Sierra Leone, Togo and Uganda), three states of India and Zanzibar (in Tanzania).

The United Nations Office for Disaster Risk Reduction (ISDR) refers to extensive risk as "the risk layer of high-frequency, low-severity losses" that "manifests as large numbers of recurrent, small-scale, low severity disasters which are mainly associated with flash floods, landslides, urban flooding, storms, fires and other localized events" (United Nations 2015, page 90). For urban areas, exposure and sensitivity to direct costs associated with extensive disaster risk is concentrated in informal settlements. Though systematic evidence to support this claim is lacking from the literature, individual accounts of loss support this. A corollary to this is to distinguish between direct and indirect impacts. Extensive risk/loss may have more direct and cumulative impact on the poor who are exposed, but indirect impact may have a wider cost. But on this, we do not know.

The threshold of 30 persons killed and/or 600 houses destroyed is currently used as the divide between intensive risk and extensive risk. Thus, all intensive risk events meet the criteria set by EM-DAT and so should be recorded there. So too do a proportion of extensive risk events – for instance in the events where between 10 and 30 people are killed.

In 2009, UNISDR set the threshold between intensive and extensive risk at 50 deaths or 500 destroyed households (United Nations 2009). This first use of the term extensive risk highlighted differences between concentrations of intensive risk and 'geographically dispersed' patterns of extensive risk. Discrepancies in the thresholds used highlight the lack of agreement even within this small field of work with implications for analysis and policy advice. This also flags concerns over variable precision in hazard identification: multiple small landsides each with minor losses may be individual cases of extensive risk, or a distributed but aggregatable single intensive event if triggered by a single earthquake or heavy rainfall event. There is no clear guidance on this, but a working assumption that the immediate cause of harm is recorded as the hazard of interest, so that in this case the loss would be recorded as extensive.

To understand and measure extensive risks, an increasing number of countries are adopting a simple and well-defined methodology to report, analyse and display disaster occurrence and losses at the local level through a standard definition of hazards, impacts and other indicators. The loss data are captured at the level of local administrative units. Thus, it records losses associated with very large numbers of small extensive disasters that do not get included on international (and often national) databases.

From an analysis of disaster reports in 12 Asian and Latin American countries between 1970 and 2007, just 0.7% of the disaster reports accounted for 84% of total mortality and 75% of destroyed housing. But other risk attributes were more evenly spread between intensive and extensive risk –

including 51% of reports of housing damage. “These low-intensity but widespread losses represent a significant and largely unrecognized component of disaster impacts and costs” (UN 2009, page 61).

By 2015, data produced nationally from 82 countries and 3 States and provinces produced 349,325 records of extensive risk disasters with the value of losses estimated to be US$94 billion (United Nations 2015). The criteria used to filter the national databases were:

- Those records related to a specific subset of natural hazards: weather related (hydro-meteorological) and geological events. Because of these filters, hazards such as epidemics are not considered, as well as all sorts of accidents (eg traffic, industrial, fire)

- Only records with any type of impact recorded

- Only those records with sufficient metadata (i.e. source information)

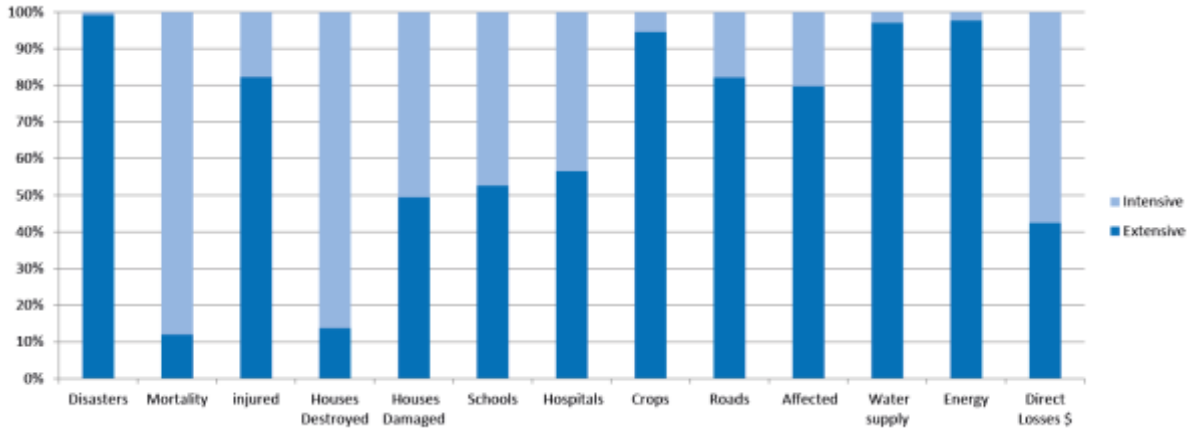
Records with impact figures considered as spurious are discarded (for instance where no data were available on the number of schools affected but data were given on the economic value of these).

What was recorded: deaths; injured; missing; houses destroyed; houses damaged; affected education centres; health centres; damages in crops (hectares); livestock lost; damages in roads (metres); and energy (electricity).

From the 349,325 records, there were

- 811,186 deaths
- 6,912,069 injured
- 3,469,370 missing
- 10,154,611 houses destroyed
- 19,547,791 houses damaged
- 677,775,496 people affected

Figure 1: The distribution of different types of losses between extensive and intensive disaster risk



Source: Serje and Ponserre (2015)

Figure 1 highlights how there are over 100 extensive disasters for each intensive disaster – but most mortality and houses destroyed are from intensive disasters. Intensive disasters also have larger direct losses (in US$). But for other impacts including injury and damages to houses, schools, hospitals, water supply, roads and energy/electricity, losses from extensive risk are much higher.

The impact of extensive events on critical infrastructure (including water supply, electricity and road systems) is of importance to Urban ARK with its focus on urban and urbanising contexts.

One among many possible examples showing the importance of considering extensive disasters comes from Colombia which in 2010 and 2011 experienced "…a strong but not exceptional El Niño Southern Oscillation (ENSO) event. The country did not experience a single, large disaster, but thousands of smaller-scale extensive events that occurred over an 18-month period and affected 93 per cent of the country's 1,041 municipalities (UNISDR, 2013) causing over US$6 billion in direct economic losses" (United Nations 2015, page 33).

Extensive risk in urban areas

Key gaps exist in the current data on extensive risk and loss. In preparing this paper, no 'big statistics' on the distribution of extensive and intensive risks between rural and urban areas were found. There are strong examples of careful documentation of extensive and intensive risks from particular cities but no summary statistics that give an idea of the kinds of extensive disasters that occur in in urban areas and their impacts. In addition, as noted above, the data on extensive disasters is only for weather-related and geological events and so do not include epidemics, traffic/transport related accidents and industrial accidents. It is not clear whether it includes accidental fires. There is also a lack of clarity in regard to the lower threshold for extensive disasters i.e. when is a disaster event too small to be considered an extensive disaster. It seems that each study of disasters done to get inclusion of extensive disasters seeks to include as low a threshold as possible given available data.

Note again that the documentation of extensive disasters are based on reports which identified losses associated with weather-related and geological hazards. So there is an important threshold separating extensive risk from most everyday hazards that cause premature death, injury and/or economic loss and that have particular relevance to urban areas – for instance the often very high levels of premature death from infants and children from diarrhoeal diseases, acute respiratory infections and malaria. Then there are the 'small' disasters that are not the result of weather-related and geological hazards such as local epidemics or fires (so common in informal settlements) and traffic/transport accidents – although some accounting of extensive risk does include some of these. Clearly, there are overlaps between the smallest disasters included in extensive risk and causes of premature death with the extent of the overlap in large part dependent on what documentation is available and how it is used

As noted above, In United Nations 2009, the threshold between intensive and extensive risk was set at 50 deaths or 500 destroyed households. This report also presented many example of how much maps that compare extensive and intensive loss reports differ. It also has examples to illustrate the importance of extensive risk – for instance for disaster loss reports in Mexico between 1980 and 2006, 44% of total economic losses in housing were associated with extensive disasters. In addition, a high proportion of losses reported in schools, hospitals and damaged or destroyed roads were associated with extensive disasters.

All the UNISDR Global Assessment Reports recognize that for urban areas with high levels of extensive risk, the key drivers are urban governments not meeting their responsibilities (and usually lacking the capacity to do so) and the large populations living in poor quality and usually overcrowded housing in informal settlements lacking risk-reducing infrastructure and services. They also recognize how much climate change is increasing or will increase risks. In poorly governed cities, the expansion of urban developments is usually generating new patterns of extensive risk mainly

associated with flooding and other weather related hazards – and may over time also concentrate intensive disaster risk. For instance, the spread of informal settlements on land sites at risk from flooding may underpin many extensive disasters but as these settlements grow and spread also increase risks from larger (intensive) disasters.

Relevance to Urban ARK

The work on extensive risk has helped transform our understanding of the scale, depth, cause, location and impact of 'disasters' by widening the criteria for what is reported as a natural hazard risk (and potentially lowering the loss threshold at which a reported event becomes recorded as a disaster). This is important because it makes us think about the appropriateness of bringing disaster risk management expertise to bear on reducing and responding to extensive risk; and on the linkages between everyday development and extensive and intensive risk. It is important to maintain a clear definition of disaster – as an event which overwhelms the coping capacity of a specific individual, organisation or system. Extensive risk and associated losses will not immediately overwhelm but in aggregate have a discernible (though often denied and rarely recorded) impact on wellbeing and on development outcomes. Importantly these losses are rarely recorded and often naturalised by those at risk and managing risk or development - as 'normal' risks of life in a location. It is important to challenge such assumptions about risk as a normal part of urbanisation processes to be borne by the urban poor. This requires extensive risk be made visible and losses recorded to better judge the effectiveness and scope for management.

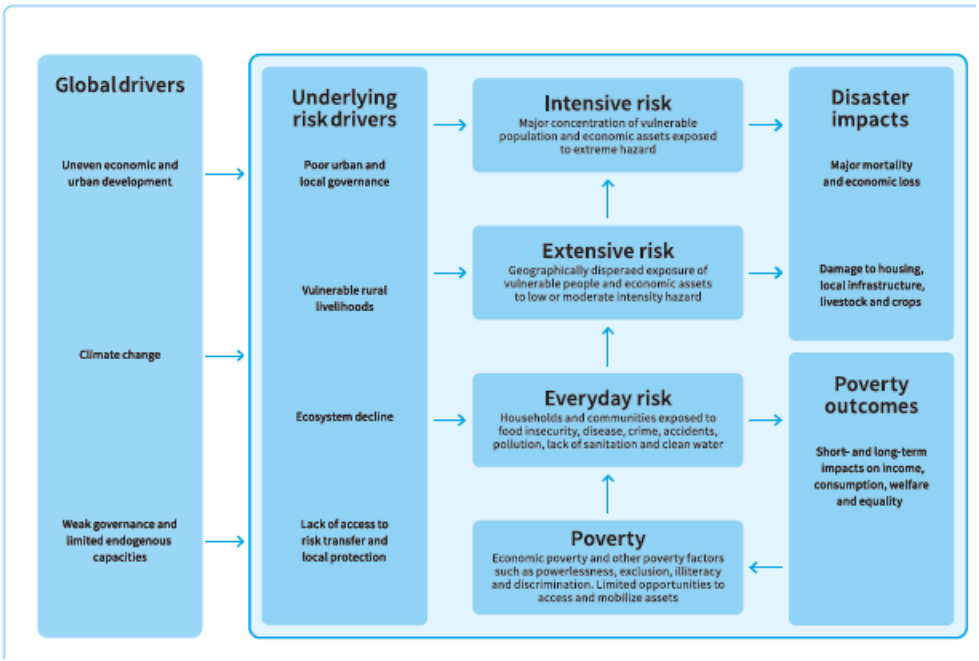
As United Nations 2015 emphasizes, extensive risk relates directly to the day-to-day concerns of households, communities, small businesses and local governments "… and therefore it can stimulate and leverage social demand for disaster risk reduction" (page xviii). At the same time, ".. because it is a risk layer that internalizes social, economic and environmental vulnerability, it can be managed effectively through an appropriate combination of prospective, corrective and compensatory disaster risk management practices" (page xviii).

The documentation of extensive risk has increased dramatically; looking just at the DesInventar initiative, this grew from 6 countries that started the development of national databases about 20 years ago to more than 65 disaster loss datasets based on the DesInventar format, covering 82 countries and 3 states or provinces.

United Nations 2015 emphasizes the importance of developing national disaster loss databases and how these are relatively low-cost and low-technology, but can have a very high impact as they provide the evidence base to support decision making. As such, this is the crucial first step to generate the information necessary for risk estimation and to inform public investment planning (Figure 2). But it is important that each record includes data on spatial location and on whether it was urban or rural (or both).

Unlike intensive risk, extensive risk is less closely associated with earthquake fault lines and cyclone tracks than with inequality and poverty. In many cases, the hazard, exposure and vulnerability are simultaneously constructed by the underlying risk drivers – see Figure 2.

Figure 2: Drivers of risk



Source: United Nations 2015

But Urban ARK needs to go further than this. We need to construct 'local' natural hazard event loss databases (at the level of particular cities or districts within cities). We also need to consider and document what everyday risks or small disaster events these are not showing (because their impact is too small, because they are not recorded, because they do not fit into the UNISDR disaster categories). Doing this will give a more complete accounting of risk. And it will allow a discussion of where the boundaries are between the lower thresholds of extensive risk associated with natural hazard triggers and other life or health threatening events and their economic consequences. Sharpening an analytical lens on everyday events emphasises the value of a people centred and integrated accounting for risk. It becomes important to place the individual at the centre of analysis and so to capture the multiple, overlapping (in time, space, impact and response) properties of risk – in contrast to a hazard led approach. A focus on the everyday also draws analysis and policy towards an integrated policy framework, rather than a sectoral view that would seek to make an impossible distinction between public health and everyday hazard loss. Exploring this boundary is a key aim of Urban ARK.

This will enable us to move from a description of losses resulting from large and small events, to a fuller understanding of the drivers of loss in different types of urban settlement. It will also support more local responses to disasters and other crises, as has been recently called for by the IFRC (2015).

What will be particularly challenging for the city teams is documenting the everyday risks for which there are no or limited systematically collected data. For instance, there may be records of accidental fires and their impacts from fire emergency services but if these exist, how complete are these (or instance what proportion of accidental fires get emergency responses and how well are these recorded). There should be records of deaths and injuries from road traffic accidents and floods – but not on premature deaths from malaria or diarrhoeal diseases. Some relevant data may be available from vital registration systems, hospital/health care system records or systems to monitor particular diseases – and from discussions with health care professionals and other groups.

This can also be enriched by including some relevant questions in household questionnaires and in other interactions with residents of informal settlements.

Most ambiguous is the threshold between extensive loss and losses arising from chronic mal-development. A key distinction is in attribution. Intensive and extensive losses entered into the ISDR and other databases are each attributed to discrete physical hazard events (tidal flooding, a small landslide). Losses from chronic mal-development arise without such visible trigger events (e.g. diarrhoea as a product of inadequate sanitation, water access, poor nutrition and underlying immunodeficiency). These are vulnerability driven risks with an ever present hazard. Conditions of mal-development also construct vulnerability that can lead to extensive and intensive scale events, but for these events to arise a discrete hazard trigger is required.

This means that chronic conditions with high health risks are of interest to Urban ARK – as a component of risk and to better understand how loss and vulnerability are related, potentially in vicious cycles, and how different forms of urbanisation and its governance influence this. We are not interested in chronic health issues *per se*. although we do need an understanding within each team of how much these high health risks figure within all risks.

For Urban ARK we need a consistent set of definitions to use when describing losses in our neighbourhood and city databases. The following is proposed:

	Deaths		Houses destroyed
Large disasters (intensive risk)	30 or more	OR	600 or more
Small disasters (extensive risk)	Between 1 and 29		Between 1 and 599
Everyday loss (extensive risk)	1 to 9		1 to 99

This means for an event to be classified as a disaster, it must lead to either at least one attributable mortality or one attributable house destruction. Such losses infer a systems collapse – the definition of a disaster. Extensive risk can lead to these impacts (small disasters) but can also produce everyday loss – no direct systems failure but rather an erosion of capacity.

At the same time non-natural hazards triggers can generate mortality, building collapse and organisational failure – disease, design failure, economic or political shocks. Urban ARK is tasked with examining the interrelationships between these other triggers, but retaining a primary interest in natural hazard associated events. This comes from a proposition that while many everyday risks – communicable disease, engineering failure, crime – are beyond the capacity of urban citizens and managers to eradicate or sometimes even to observe and monitor, they are at least recognised. Everyday risk associated with natural hazards is systematically left out of urban planning processes. It may be that everyday risk associated with natural hazard events is less important than initial data suggests but at this point the lack of systematic study leaves the question open. The result is an ambiguous policy space – should everyday risk be the domain and responsibility of public health, community development, and emergency response? If as seems likely, a people centred and integrated approach comes from the analysis of everyday risk and its relationship to public health and more intensive risk then this will further reinforce efforts to build resilience into urban planning and development.

Individual studies are encouraged to include reports of discrete loss events triggered by technological hazards (transport accidents, pollution events, explosions, riots) and discrete epidemic events (eg Cholera). An epidemic is the rapid spread of infectious disease to a large number of people in a given population within a short period of time, usually two weeks or less. This will allow us to analyse the relative importance of natural hazard associated events, and to explore interactions with other hazard types.

Endemic disease (an infection is said to be endemic in a population when that infection is maintained in the population without the need for external inputs) will often have far higher losses associated with them over time – for example, annual mortality to diarrhoea, malaria, acute respiratory infections or HIV-AIDS. Individual studies would be very valuable if they can identify specific endemic health conditions as early-warning for emergent epidemic health or disaster risk, or indicators of vulnerability for physical hazards. We should aim to explore the messy boundaries between risks from endemic disease and epidemic disease and technological and natural hazard risk – but the Urban ARK point of entry is natural hazard risk and its management. Applying rigorous health assessment methods is beyond our scope with some key exceptions (notably the Nairobi, Mombasa and Dakar studies that will include public health indicators with pollution monitoring and associate these with the precondition for risk from flooding, fire and landslide).

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