

2016



World Disasters Report

Resilience: saving lives today,
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World Disasters Report 2016

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investing for tomorrow



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Editors: David Sanderson and Anshu Sharma

Main contributors: Adriana Allen, Brooke Avory, Pandora Batra, John de Boer, Edward Cameron, Jessica F Carlson, Paul Currión, Hilary Tarisai Dhliwayo-Motsiri, Maria Fellizar-Cagay, Joanna Friedman, JC Gaillard, Andrew Gissing, Mark Harvey, Jennifer Jalovec, Abhas Jha, Rohit Jigyasu, Sumaiya S Kabir, Aynur Kadihasanoglu, Robert Kaufman, Ilan Kelman, Petr Kostohryz, Karen MacClune, Bernard Manyena, Jane McAdam, John McAneney, Matthew McLaren, Mike Meaney, Maureen Mooney, Naushan Muhaimin, Virginia Murray, David Nash, Dewald van Niekerk, Rosemarie North, Laban Ogallo, Marcus Oxley, Ronak Patel, Ben Ramalingam, Andrea Rodericks, Liliana Miranda Sara, Alison Schafer, Rajib Shaw, Pamela Sitko, Zuzana Stanton-Geddes, Maggie Stephenson, Leda Stott, Shipra Narang Suri, Thomas Tanner, Akapusi Tuifagalele, Kanmani Venkateswaran, Paula Silva Villanueva, Swarnim Wagle, Emily Wilkinson and Michelle Yonetani.

Editorial Board and Reviewers: Khurshid Alam, Diane Archer, John de Boer, Andrew Cartwright, Shannon Doocey, Mahmoud Khamis El-Sayed, Nabeel Hamdi, Mo Hamza, Karen Jacobsen, Cassidy Johnson, Jerold Kayden, Kamal Kishore, Unni Krishnan, Ronak Patel, Ben Ramalingam, Rachel Scott, Rajib Shaw, Jo da Silva and John Twigg.

Project managers: Josephine Shields Recass, Victoria Stodart, David Fisher

Design and production team: Philippe Boisson, Sébastien Calmus, Lenka Matousek, Damien Naylor

Copy-editor and proofreader: Mary Dobbyn

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Contact details:

International Federation of Red Cross and Red Crescent Societies

P.O. Box 303

CH-1211 Geneva 19

Switzerland

Tel.: +41 22 730 4222. Fax: +41 22 7304200

E-mail: secretariat@ifrc.org

Web: www.ifrc.org

To order copies of the World Disasters Report, please contact wdr@ifrc.org.

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Resilience: saving lives today, investing for tomorrow

Earlier this year, during a visit to rural Zimbabwe, I met Victor digging in the middle of the dry Mudzi riverbed. Kneeling in the dirt next to him, I asked what he was doing. “Digging for water,” he said. He had indeed been digging for about an hour, he explained, and managed to draw about half a gallon of dirty water.

Like millions of people in Zimbabwe, and tens of millions across southern Africa, Victor was struggling to survive in the midst of a terrible drought, influenced by one of the worst El Niños on record. As I write this, an estimated 40 million people are affected, with 23 million of them likely to need emergency assistance before the end of the year. It is a truly desperate situation that has occurred in near silence, with little of the attention and resources needed to reduce its impact.

Humanitarian needs are growing at an extraordinary pace – a historical pace – and are outstripping the resources that are required to respond. That is a familiar refrain, but one that sadly is worth repeating here. It goes some way to explaining why the situation in Zimbabwe, one that is both despairingly sad and sadly predictable, has come to pass. The human suffering has been lost amongst the conflicts and mass displacement around the world that dominate the humanitarian landscape.

‘Business as usual’ is no longer acceptable. It will only lead to further silent suffering as more and more people exhaust all coping mechanisms and are left to fend for themselves without the help they so desperately need.

This *World Disasters Report* makes the case simply and eloquently for a different approach to humanitarian action, one that strives to strengthen the resilience of vulnerable and at-risk communities. To paraphrase the report: investing in resilience saves lives and money.

This is by no means a new idea, but the widening gap between available resources and persistent, urgent needs in southern Africa, the Sahel, the Horn, across South and South-East Asia, and in many parts of Latin America, makes it more compelling and more urgent than ever before. If we are to break this cycle of crisis-response, and make real progress towards the Sustainable Development Goals and disaster risk reduction, the answer is not just better response: it must also be fewer people in need.

A focus on resilience should not replace or undermine the humanitarian imperative that demands that all need is addressed directly and with dignity. Effective and efficient response will always be needed, and should be wholly defended. Resilience and response are not at odds with each other. Building resilience is a logical extension of

the humanitarian imperative. Our shared humanity compels us to go the extra mile to reduce the scale and impact of shocks and stresses, and to help communities to recover better and stronger.

This is about more than creating a new way of working, it is also about finding a new way of working together. Building resilience requires partnerships – with communities, local humanitarian actors, development agencies, governments and with the private sector. It forces us to go beyond our institutional priorities, step out from our silos and to commit to working together in a spirit of true collaboration.

This thinking is at the heart of the “One Billion Coalition for Resilience”, an initiative which was launched by the IFRC in late 2015 that aims to transform the state of resilience in the world. By creating networks of caring individuals, motivated communities and like-minded organizations from all sectors, the IFRC and its partners will support 1 billion people to take action that builds resilience by 2025.

This report calls on us to adopt ‘resilience thinking’. All our interventions, at all points along the humanitarian continuum, must seek to strengthen resilience. This must be backed by funding for resilience. Barriers to investment need to be identified and overcome.

This brings us back to Victor in the dry riverbed in Zimbabwe. He was not passively waiting for authorities or aid groups to provide assistance. With the limited resources that he had, he was taking action. But it wasn’t enough. This is what resilience is about: empowering people to help themselves. It is about putting our plans and efforts at the service of their initiatives and their capacities. We must step past the artificial divide between humanitarian action and development, and constantly be there on the side of communities to accompany them into a future less fraught with risk and vulnerability and defined more by their own interest and capacity to thrive.



Elhadj As Sy
Secretary General



Making the case for resilience

“Fall seven times,
stand up eight”
Japanese proverb

The year 2016 may well prove to be a turning point in how humanitarian aid responds to crises. For one, the need is great: forced migration from conflict is at its highest since World War II (IDMC, 2016); the number and scale of disasters triggered by natural hazards are increasing (UNISDR, 2016); 2015 was the hottest year ever recorded (NASA, 2015). Also, the current aid sector, largely unchanged in 75 years, is struggling to cope. The first-ever World Humanitarian Summit (WHS), convened in May to ‘rethink’ aid, acknowledged that “woefully under-resourced humanitarian response” has to “do much more far better” (UN, 2016, 2). To achieve this, some argue that radical change is needed, because “the formal system faces a crisis of legitimacy, capacity and means, blocked by significant and enduring flaws that prevent it from being effective” (Bennett, 2016, 7).

At such a dramatic time, then, what meaning does resilience have? *Do we really need another concept?*

In making the case for resilience, this edition of the *World Disasters Report* argues that the concept of resilience provides a readily-understandable approach for addressing many of the challenges faced in humanitarian aid. This edition therefore reflects a particular – and possibly unique – time in the international community’s approach to disasters and other crises, when better evidence is demanded to make choices about where to invest limited resources in the face of growing need. It argues that the strength of the concept of resilience lies not in any particularly new understanding about how to manage crises, but rather in the reassertion of fundamental principles, tested over decades. Central to these principles is that the best actions are people-centred, and that pre-disaster investments to reduce or even prevent crises are essential.

FIGURE 1.1 Resilience: one word, many understandings



Zimbabwe. 15 May, 2016. During a devastating drought that is gripping the region, local communities are sometimes forced to dig a dry riverbed to obtain a small amount of water. © Juozas Cernius

A dozen years of escalating need

This is not the first edition of the *World Disasters Report* to examine resilience. Twelve years ago, in 2004, the theme was a “focus on community resilience; building the capacity to bounce back”. The introduction in that edition identified the challenges of “soaring urban populations, environmental degradation, poverty and disease” which “are compounding seasonal hazards such as droughts and floods to create situations of chronic adversity” (WDR, 2004).

These words could also be written for this 2016 edition. Urban populations continue to soar (by the end of 2004, 49 per cent of humanity lived in cities; by 2015 this had increased to 54 per cent). Poverty remains a global challenge. While the close of the Millennium Development Goals (MDGs) at the end of 2015 noted progress in poverty reduction, the final report recorded 836 million people living in extreme poverty, as well (UN, 2015). The same report also referred to a 50 per cent global increase in carbon dioxide emissions since 1990, the continued destruction of rainforests, overexploitation of marine fish stocks, and water scarcity that affects 40 per cent of humanity which is “projected to increase” (UN, 2015, 8).

While many of the challenges identified in the 2004 edition remain, the world in the past 12 years has also witnessed some very big changes. Between 2004 and 2016 the UN’s annual appeal for international aid increased from 3.7 billion to 20.1 billion United States dollars (US\$) (Banning-Lover, 2016). Since 2004 there has been a number of massively destructive events. At the end of 2004, the Asian Boxing Day tsunami killed approximately 230,000 people across 14 countries. The 2010 floods in Pakistan directly affected around 20 million people, and have continued to displace substantial numbers each year. In regard to drought, during 2011 and 2012, more than 12 million people in the Horn of Africa were severely affected in what has been called the worst drought in 60 years. The Ebola outbreak in West Africa, beginning in March 2014, led to 11,310 deaths across Liberia, Sierra Leone and Guinea (WHO, 2016).

The Haiti earthquake of 2010 provided a terrifying ‘perfect storm’ of a major earthquake striking one of the poorest countries in the western hemisphere. The population loss, of between 100,000 and 316,000 (the uncertainty of the figure highlighting the precarious governance of the country), served to illustrate weaknesses in urban areas ill-prepared for such disasters, and an aid sector also unequipped for the urban challenge. Other large-scale disasters – such as Japan’s 2011 Tōhoku earthquake and tsunami and the Philippines’ 2013 Typhoon Haiyan – as well as numerous smaller disasters triggered by natural phenomena reinforce the increasing threat of such events.

The number of disasters continues to rise, as a result of a combination of increased vulnerability (from more people living in dangerous places) and climate change. During 2015, a total of 574 reported disasters, caused by earthquakes, floods,

landslides and heat waves, had killed almost 32,550 people, affected over 108 million people, and caused US\$ 70.3 billion in damage (see Annex).

In 2004, the *World Disasters Report* noted that, for that particular year, disasters triggered by natural hazards weren't the biggest threat, however. This remains true. For 2016, the greatest humanitarian challenge has been forced displacement across the world. With regards to migration caused by conflict, by May 2016, the war in Syria (probably exacerbated by drought-fuelled urban migration) has led to more than 4.8 million refugees fleeing the war-torn country, with the vast majority hosted by the neighbouring countries of Lebanon, Turkey, Iraq and Jordan. A further 6.6 million Syrians are internally displaced and more than half the country's population in need of help. In addition, in 2015, 2.2 million people were displaced in Yemen, more than in any other country that year (IDMC, 2016).

In 2015, at least 3,770 migrants are thought to have died while attempting to cross the Mediterranean to Europe, with numbers increasing in 2016 (IOM, 2016). In South Sudan's civil war that erupted in mid-December 2013, many thousands have been killed and an estimated 1.5 million people have had to flee their homes (Human Rights Watch, 2015).

There has also been good news. By improvements in preparedness, many disasters have been reduced or even totally prevented, the latter being all but impossible to measure. Bangladesh, which suffered the blow of between 300,000 and 500,000 killed in Cyclone Bhola in 1970, reduced casualties through better preparedness to a little over 3,000 in Cyclone Sidr in 2007, and 190 in Cyclone Aila in 2009 (while the cyclone size varied, the reduced death count has been widely attributed to improvements in disaster preparedness). Another example is HIV and AIDS: the 2004 edition reported that some 2.2 million people had died in sub-Saharan Africa. New HIV infections have fallen by 38 per cent between 2001 and 2013, with death from AIDS-related illnesses having fallen from a peak in 2005; this has prompted the UN to say that the global AIDS epidemic can be controlled by 2030 (Reuters, 2014).

BOX 1.1 Resilience and conflict: bounce back to what?

Armed conflict is not like an earthquake or a flood; it is entirely man-made and, *by design*, dismantles mechanisms for resilience. Conflict inflicts psychological trauma, separates families, divides communities, eradicates livelihoods, destroys infrastructure, diverts public funds from social services, and leaves behind explosive remnants of war, all of which will undermine resilience long after fighting has stopped. Armed conflict is the flood that ebbs and flows for years or decades, eroding protective systems in the process.

Writing about resilience in contexts defined by violence feels impossibly difficult. For example: for the third uninterrupted year, the humanitarian community finds itself in a full-scale emergency response in South Sudan's Malakal Protection of Civilians Site, one of six such sites housing 200,000 of South Sudan's 2.3 million displaced population. This site is badly damaged, regularly flooded and has been repeatedly and violently torn apart by ethnic violence. It is a host for disease and hunger and is rife with unchecked criminality and sexual violence. Armed actors of every variety hem in the site. The power brokers who caused this catastrophe, waging war indiscriminately against the civilian population, are the same who now shake hands over another in a long list of ceasefires, cessations of hostilities, or transitional governments. This place is demoralizing. This does not feel like a space for the optimism of resilience. What's more – it is not unique and can be found in many of the world's many fragile and failing states.

Resilience has joined the ever-expanding humanitarian lexicon, exalted in Geneva, London, Brussels or Washington DC, but what does it mean in Aleppo, Kandahar, Bentiou or Donetsk? When donors and UN agencies give resilience a broad, vague definition, they fail in their aim to inform or influence humanitarian programming meaningfully in the world's most dangerous places. In many instances, humanitarians at the field level hastily and half-heartedly define it as anything that 'mitigates negative coping strategies' and rebrand existing work as resilience-building programming.

A more colloquial definition of resilience is simply the capacity to 'bounce back'. This definition falls short, however, when we ask the logical follow-up: "Bounce back to what"? In many cases, the prewar condition is neither attainable nor desirable. To a large extent, in conflict-affected areas the prewar system itself was corrupt, weak and violent and itself precipitated war. There is no bouncing back to that nor is it desirable to 'build back better' on this fundamentally-flawed foundation. In this respect, if we seek resilience, what we seek is something transformative.

Reflecting on these challenges, questions arise. Does resilience have a place in humanitarian conflict response, and if it does, what is that place? A compelling argument can be made that in places where suffering and vulnerability stem largely from political violence (i.e., Syria, Iraq, South Sudan) efforts to "reduce chronic vulnerability" (part of USAID's definition of resilience), while admirable, are not compatible with the humanitarian imperative or principles of impartiality and neutrality. However, even if reducing chronic vulnerability is not the immediate aim of the humanitarian response to conflict, it does not entitle humanitarians simply to neglect the underlying causes of chronic vulnerability, in the name of the 'humanitarian imperative'. The first step in reducing chronic vulnerability is understanding it, which can be done concurrently with saving lives.

Perhaps the most meaningful contribution that resilience can make to programming in violent contexts is to address the desperate need for robust analysis that goes beyond needs assessments, which return little more than a set of vulnerability criteria and a shopping list. Analysis influenced by resilience would deliver a deeper understanding of how a community or society has changed and adapted in response to the pressures of conflict. It would consider the community's capacities and mechanisms for providing protection and meeting the basic needs of its members and, importantly, consider whether or not these mechanisms can be sustained if the conflict continues and if they are compatible with peace.

As the threat and hardship of conflict drag out across years, communities have to view resilience as the capacity to endure and survive in a violent environment indefinitely. Consequently, they may employ coping strategies, which mirror the conflict itself and are ultimately incompatible with peace. Examples include 'strongman' governance, the arming and militarization of the civilian population, and the near-complete exclusion of the 'other' (ethnicity, religion, political alliance). From the community perspective these strategies may be effective in providing stability, protection and helping to weather conflict indefinitely. Such coping mechanisms are inappropriate for life after conflict, however; they deepen resentments, reinforce negative messages and paradoxically perpetuate the very conditions the community is struggling to be resilient against.

If resilience is to be useful in humanitarian conflict response, it must first be acknowledged that there are contradictions between the common understanding of resilience building and the humanitarian principles in times of conflict. To enable resilience, humanitarians must not be expected to address the underlying causes of chronic vulnerability, when those causes are often deeply political. However, evidence of resilience may be used to inform humanitarians on a deeper level about how the population of concern has adapted to conflict, and to what extent those adaptations are compatible with war or peace. This heightened conflict sensitivity will improve the quality and accountability to the response, and, context permitting, transition to early recovery. ■

Resilience – confusion or clarity?

As Box 1.1 above demonstrates, the term 'resilience' may not always be thought to be helpful. Indeed, resilience seems to be in use everywhere, not just in humanitarian aid. A cursory online search for the term will yield its use in sports ("athletic resilience"), the private sector ("business resilience"), science, security ("critical infrastructure resilience"), economics and politics. As a result, there are reports of "resilience weariness": a piece in *The Boston Globe* titled "What's all this talk about resilience?" suggested that "peak resilience" (in reference to peak oil, where oil supply can only dwindle afterwards) may have been reached when US President Obama stated that the American people needed "to be strong... to be resilient... to refuse to give in to fear" during an address at the Central Intelligence Agency (CIA) (Beam, 2016).

The word ‘resilience’ is not new – it has been around (in English) since at least the early 17th century (Alexander, 2013). In current understandings, resilience’s roots emerge from engineering, where the notion of ‘bouncing back’ refers to the elasticity needed in materials within structures such as bridges; from ecology, where resilience is understood as the ability of a system to maintain its normal patterns after being subjected to damage caused by an ecological disturbance; and from psychology, where resilience is understood to relate to how well people cope emotionally with adversity (see Chapter 5 concerning mental health and psychosocial support).

Within the aid sector, numerous definitions of resilience, emanating from one or more of the roots mentioned above, are currently in use: one recent review counted 13 operational frameworks, indices and tools relating to resilience, and a further 22 that related to fragility and risk (Bosetti et al., 2015). Partly as a result of this, many argue that the term is confusing. Others argue that using resilience within the aid sector is outdated, and better terminology such as ‘robustness’ and ‘transformation’ offers clearer or deeper understandings. Box 1.2 below discusses some of the other critiques.

BOX 1.2 Critiques of resilience

Resilience has become an important discourse for and debate within the disasters and development field (Manyena, 2006; Alexander, 2013). It brings many useful and usable ideas. Yet in embracing resilience, has anything been usurped or lost in on-the-ground development? The answer emerges from three principal limitations in how resilience is applied and interpreted: (1) the domination of ecological ideas (within development), (2) poor scope for translation across cultures, and (3) obscuring wider and deeper issues of disasters and development.

The term ‘resilience’ is accepted with so many different, and often incompatible, definitions, yielding diversity and space for discussion and exchange. Despite the many definitions from numerous disciplines, an ecological basis has tended to dominate within many development subfields, including climate change adaptation. This perspective provides particular characteristics which are only present in idealized situations of ecology, which may well not apply to the social reality of disasters and development (Weichselgartner and Kelman, 2015).

Ecology has traditionally characterized resilience through external observation, drawing boundaries around a ‘system’ – now sometimes termed ‘social-ecological’ – and ‘objectively’ assessing this system from an external influence (Lewis and Kelman, 2010). Ecology as a discipline is changing to some extent, recognizing the many different contexts inherent in all analyses of nature and the environment (Renaud et al., 2013). Full understanding and acceptance of resilience’s subjectivity and context-dependence have still to penetrate many dominating ecological analyses.

In particular, ecology's view of resilience can assume an underlying quantitative foundation, which means that resilience could and should be calculated. Disasters and development work demonstrates the importance of including qualitative characteristics when considering resilience (Gaillard, 2007). Preserving livelihoods and daily routines such as attending school, maintaining sacred and cultural sites, and retaining irreplaceable items such as photographs often significantly assist individuals and communities in dealing with disasters. Quantifying and calculating these intangible parts of life is rarely feasible; this means that quantitative and qualitative approaches ought to be combined to gain a full picture of resilience.

In fact, objective approaches have the limitation of imposing on resilience a snapshot view. Conducting an assessment in a bounded location at a specific time (in effect, taking a quick picture) assumes that resilience can be understood completely. In reality for disasters and development, resilience is far more complicated and subtle than objective, bounded approaches presume (Kelman et al., 2015, 2016).

Why certain levels or dimensions of resilience are observed in a particular place at a particular time can be explained only through wider and deeper explorations. The processes by which the current state was reached and the directions in which the current state is heading must be known to describe resilience fully.

This 'resilience process' refers to the values, ideas, behaviours and actions that have led to the currently observed snapshot and that create future directions (Lewis and Kelman, 2010). Resilience, even of a supposedly isolated ecosystem, which on earth will still be undergoing major influences from human activities, cannot be understood without investigating history, politics, people and communities. Such analyses are necessarily subjective and qualitative. Nothing prevents quantitative approaches in combination with qualitative ones, but the numbers must always be contextualized so that the quantitative analyses have subjective and qualitative aspects too.

The term 'resilience' and many definitions of it are not necessarily immediately transferable among contexts (Alexander, 2013). Neither the word 'resilience' nor its cultural theory exists in many languages or cultures, such as indigenous Pacific islander or indigenous Arctic languages. Norwegian now directly translates the word as *resiliens*, based on the English word, because other Norwegian forms for 'resilience' translate back to English as 'robustness' (*robusthet*) or 'resistance' (*motstandskraft*).

Therefore, the fundamental ideas and applications of resilience are not and cannot be universal. This statement does not remove the term's use in English or languages which include the term, merely indicating the importance of learning to translate the word and concept into different linguistic and cultural contexts. A diversity of definitions and approaches could also be a strength of the concept, encouraging discussion for understanding differing resilience-related needs and preferences. Alternatively, the term could be bypassed entirely to favour local conceptualizations and vocabularies. Accepting resilience as being contextual and working through it for each context can overcome many of the above critiques (for examples, see Lewis, 2013ab; Sudmeier-Rieux, 2014).

Otherwise, resilience might sustain excuses to cover up conditions which can contribute to disasters, often described as vulnerability. By labelling people as ‘resilient’, an impression can be formed that they have managed and will continue to manage without problem, irrespective of future disasters or other troubles. Using the label ‘resilience’ can absolve responsibility for wider action because it appears that nothing further needs to be accomplished.

Suggesting resilience as a state of being or an end product can lead to a false sense of security, detracting from the continuous action and attention required. Consequently, the feeling can be that vulnerability conditions and evidence do not need to be investigated further because resilience has been identified and supported (Lewis and Kelman, 2010).

Too often, in naming resilience (and vulnerability), key questions are not answered. Resilience for what and for whom? Resilience to what and to whom? Resilience of what and of whom? Who sets the agenda, who acts or is forced to act on the agenda, who reaps the rewards, and who pays the costs? Where vulnerability fails to answer such questions, replacing it with ‘resilience’ hardly helps.

It is not just the power brokers such as donors or government and corporate leaders who could misuse resilience. People and communities accepting their own resilience might feel that their work has been completed, so they think nothing more is needed. In reality, dealing with disasters and development is not about one-off actions to be finished and then forgotten. Instead, it is a continuing process to be integrated into all facets of life, just as resilience (and vulnerability) are processes (Lewis, 2013a).

Defining, identifying, interpreting and applying resilience should be at many scales, multi-contextual, and a continual process. Ultimately, the concern about ‘resilience’ is not in the specific term or word, because any phrase can be abused and misused. Instead, the critiques of ‘resilience’ relate to the dominant discourses along with uncritical acceptance and application of those discourses. ■

Common themes from many definitions

Perhaps unsurprisingly, this edition of the *World Disasters Report* argues that resilience is a helpful concept which will continue to have traction for some time to come. Indeed, the understandings embodied within resilience have been around for a long time already. People have always acted in ways that promote their resilience: there is ample evidence of ingenuity in beating risks. Construction workers in the remote and highly seismic Himalayas could build multi-storeyed earthquake-resistant buildings that have since stood for more than 800 years (Rautela and Joshi, 2007). Algeria developed the science of base isolation – building structures on rollers so that they could avoid shaking with the ground in an earthquake – over 400 years ago (Abdessemed-Foufa and Benouar, 2008). Communities across Asia and Africa evolved seed and fodder banking systems across generations of learning how to deal with droughts, rivers were trained, livelihoods diversified and settlements planned

in accordance with a deep local understanding of risk and an innovative development of strategies for resilience (Shaw et al., 2009).

An examination of many of the concepts of resilience reveals common understandings. In a recent review of operational definitions of resilience, Sitko (2016) identified a number of commonalities. These include an emphasis on coping with rapid-onset disasters (shocks) as well as slower-onset events (stresses), the inclusion of recovery, and reference to longer-term survival. An additional observation from Bosetti et al. (2015, 7) is that resilience is a process, rather than an outcome, noting that “although there are milestones along the way, it is difficult to conceive of an ideal resilient state”.

These commonalities, and the focus on process over outcome, are represented within the IFRC’s definition: “Resilience is the ability of individuals, communities, organizations or countries exposed to disasters and crises and underlying vulnerabilities to anticipate, reduce the impact of, cope with, and recover from the effects of shocks and stresses without compromising their long-term prospects” (IFRC, 2015). This definition, like many others, embodies long-standing approaches in aid – notably, this and other definitions of resilience bear a striking resemblance to Chambers and Conway’s 1991 definition of livelihoods (Chambers and Conway, 1991), an approach popular in the second half of the 1990s to the mid 2000s (Sanderson, 2009) – and identified in Chapter 7 as one of the contributors to ‘the rise of resilience’.

IFRC’s resilience definition begins with ‘the individual’, asserting the people-centred nature of effective resilience (the definition, for instance, does not begin with what aid can provide, or a particular disaster type). Starting with people is important: in the words of the Malaysian non-profit organization Force of Nature Aid Foundation (undated), “The strongest force of nature is the strength of the human spirit”.

IFRC’s definition emphasizes local capacity and its ability to be strong (withstand) in preparation for a potentially overwhelming event. The *World Disasters Report* 2004, drafted in the shadow of the Bam earthquake in Iran of 2003, drew out the common principle that in the hours after a sudden disaster, most lives are saved by the courage and resourcefulness of friends and neighbours, and in the context of slow-onset crises such as drought, rural communities have developed extraordinary capacities to cope and bounce back.

While the international media (and the odd, badly-scripted Hollywood film) tend to portray disaster-affected communities as helpless – saved only by outside aid, and many aid agencies and donors see them in a similar light – in real life, survivors of disaster have saved people with their bare hands, and pulled themselves through the crisis by supporting each other. This core of the spirit of resilience

is the greatest asset in the fight against crises, and needs to be strengthened, not undermined, in the course of aid efforts.

The definition also gives as much attention to what happens before the event (“anticipate” and “reduce the impact of”) as it does after the event (“cope with” and “recover from”). A good example of the former, reported on in the 2009 *World Disasters Report*, concerns the 23 cyclone shelters in Odisha, on the eastern coast of India, which, along with a local warning system, saved 42,000 lives in a cyclone in 1999, during which more than 10,000 persons were otherwise killed. Fast-forward to 2013 and 2014 when two cyclones – Phailin and Hudhud respectively – hit Odisha. The death tolls were in low two-digit numbers – 38 and 25 respectively. While many factors may have contributed, two were significant. Although comparing cyclones is a complex matter with multiple variables, the progress made in terms of improved early warnings, highly penetrative last-mile connectivity and better local understanding on how to respond to warnings is well documented.

Resilience also helps to introduce new terms to long-standing issues. “Transformative capacity”, for instance, often relates to “deep social change” across social-ecological systems (Wilson et al., 2013). Three words which find application at all stages of enacting resilience are: anticipation (preparation for something that may well happen); absorption (the ability to cope with adverse conditions); and adaptation (the ability to become better suited to one’s environment). According to Bahadur et al. (2015, 12), “Communities’ ability to deal with shocks and stresses is derived from inter-linked absorptive, anticipatory and adaptive capacities”. This observation results from a study where anticipation, absorption and adaptation (coined “the three A’s”) are being used as the basis for monitoring the results, or resilience outcomes, of a three-year programme, BRACED – Building Resilience to Climate Extremes and Disasters – which is currently working across 13 countries in the African Sahel, East Africa and South-East Asia. With support from the UK Department for International Development (DFID), BRACED funds a number of smaller projects that include changing farming practices, natural resource management, livelihoods and public information (BRACED is discussed further in Box 2.4 in Chapter 2.)

Finally, it should be noted that while this section used the IFRC’s definition of resilience, this edition of the *World Disasters Report* includes a number of different understandings drawn from other sources. This is not intended to confuse; rather, it aims to present – and reflects – some of the breadth of current thinking behind this conceptual understanding and its use in practice. While traditional views of resilience may focus primarily on bouncing back from disasters in any given context, the nuances of disaster resilience are seen by others very differently in complex situations such as forced migration, which is further discussed in Box 1.3.

BOX 1.3 Forced migration from disasters

In 2014, more than 19.3 million people in 100 countries fled their homes in response to disasters stemming from natural hazards, mostly within their own countries but sometimes across international borders. Since 2008, such disasters have displaced an average of 26.4 million people each year – the equivalent to one person per second. These figures from the Internal Displacement Monitoring Centre (IDMC, 2016) highlight the vast scale of disaster-related displacement, and the need for well-conceived strategies to reduce people's exposure to hazards and enhance their resilience.

Following a disaster, one of the chief determinants of whether people will move at all, how far, over what time-frame and in what manner is how resilient they are to withstanding its impacts. Physical resilience stems from such things as implementing and enforcing building codes, creating safe living environments and having early-warning systems in place. Socio-economic resilience relies on people having access to information, social networks, livelihoods and resources.

Indeed, whether a natural hazard results in a 'disaster' – something that "exceeds the ability of the affected community or society to cope using its own resources" (UNISDR, 2016) – is conditioned by underlying social, economic, political and environmental factors, which differ from community to community and from person to person. Some people may be more vulnerable to displacement on account of their age, health, gender or income level. Others may endure repeated disasters, but eventually find that their coping capacity is overwhelmed as they reach a 'tipping point'.

In such situations, governance is key. The nature and timing of policy interventions will play a major role in determining outcomes following a disaster, as they affect people's resilience and coping capacity. They can influence whether people are displaced for prolonged periods, what resources they can access and how readily, and whether they have options to move to more secure areas to enable them to rebuild their lives. In a study of Bangladesh's severe floods in 1998, it was found that people who felt adequately supported were less likely to move further afield after the initial period of displacement (Paul, 2003). Such assistance helped to build community resilience by providing technical solutions, encouraging disaster risk reduction and creating alternative livelihoods.

A number of recent international instruments reinforce the importance of building resilience in disaster-affected communities, including the *Sendai Framework for Disaster Risk Reduction 2015–2030*, the *2030 Agenda for Sustainable Development* and the *2015 Paris Agreement on Climate Change*. The last of these emphasizes the need to enhance the resilience of socio-economic systems through economic diversification and sustainable management of resources, which is something that well-planned migration can help to address.

Certainly, there are several strategies which governments can put in place to reduce the potentially devastating impacts of disaster-related displacement. These were usefully adopted by the Nansen Initiative on Disaster-Induced Cross-Border Displacement in its *Agenda for the Protection of Cross-Border Displaced Persons in the context of Disasters and Climate Change* – a document itself driven by the urgency to reduce vulnerability and build resilience to displacement risk – which was endorsed by 109 states in 2015. These are outlined and elaborated upon below.

Firstly, communities that implement effective disaster risk reduction and climate change adaptation measures may be better protected against displacement if disaster strikes. Attention to building codes, urban planning and infrastructure is crucial, because creating safer living environments may reduce exposure to future hazards (and not doing so may increase it). While it may not be possible to safeguard against displacement altogether, contingency planning means that if people are displaced, they may be able to return home relatively quickly. Temporary, planned evacuation provides a pathway to safety and emergency support, whereas sudden displacement is chaotic, disorganized and uncertain.

Secondly, development must be sustainable. Poor development practices can make already fragile environments more susceptible to hazards, consequently placing the lives of inhabitants at greater risk. For instance, logging may make hill areas more susceptible to landslides; building concrete walls along fragile coastal areas may interfere with natural formation. Implementing long-term, sustainable development projects can enhance community resilience over time by creating new labour opportunities and technologies, and improving the capacity for self-help.

Thirdly, as some displacement will be unavoidable, and international refugee and human rights law offers very limited protection in the disaster displacement context, governments should develop more predictable humanitarian and temporary stay arrangements to assist those displaced across a border after a disaster (such as through bilateral agreements, special visas, targeted use of existing migration categories, or by means of discretion on humanitarian grounds). They should also strengthen the operational implementation of the *Guiding Principles on Internal Displacement* (OCHA, 2004) for people displaced within their own country, which set out people's needs and entitlements during the different phases of displacement.

Fourthly, migration itself can be a form of resilience. Moving away from the impacts of a disaster – or projected future disasters – is a rational and long-standing adaptation strategy. In the short term, it is a means of escaping from danger; over time, it can enhance resilience by opening up new livelihoods, skills, knowledge and opportunities. Temporary or circular schemes, such as seasonal worker programmes in the agricultural industry, can help to diversify income bases and create more resilient households. Likewise, more permanent migration can expand resources and networks, and provide a safety net for those who stay and those who move. It may simultaneously ease demographic and resources pressures in affected areas.

For these reasons, the government of the small island state of Kiribati advocates 'migration with dignity' or 'merits-based migration'. By identifying skills shortages in other countries in the region and providing training in those areas, the aim is to make Kiribati nationals more competitive for jobs overseas. This is seen as a positive alternative to potential future displacement and reliance on humanitarian support. Between 2006 and 2014, a small, innovative scheme called the Kiribati–Australia Nursing Initiative gave around 90 Kiribati nationals the opportunity to study nursing in Australia. On graduation, they were eligible to apply for a skilled migration visa, enabling them to remain as permanent residents in Australia.

Finally, planned relocation may enable people to move out of harm's way before disaster strikes, or to relocate to safer areas after a disaster if return home is not possible. This requires careful consultation and planning to avoid greater vulnerability and impoverishment, and affected communities must fully be consulted and engaged in the decision-making process, with their rights and interests safeguarded. ■

A 'good enough' understanding...

Critics, as noted above, argue that the lack of a commonly agreed definition is a weakness. This however is to miss the point – the chief benefit of a resilience-based approach lies in its broad understanding and not in the detail of minor differences between definitions. To these ends, as well as a number of leading NGOs developing the popular *Good Enough Guide: Impact Measurement and Accountability in Emergencies* (Oxfam, 2007), so too does resilience offer a 'good enough' word for promoting efforts to address pre-crisis actions – at least as much as post-crisis response – and to combining developmental and emergency-related actions.

There is evidence of this in action. The 2011 independent *Humanitarian Emergency Response Review* (HERR) of the operations of DFID introduced resilience as its key strategy for uniting what were previously largely regarded as separate activities: "We need to place the creation of resilience at the heart of our approach both to longer-term development and to emergency response" (Ashdown, 2011, 4).

The IFRC's *Framework for Community Resilience* notes that "the concept of community resilience represents a unique opportunity as this approach in many ways captures the totality of what the IFRC is working to achieve" (2014, 3). Similarly, the 2015 'call to action' following the Norwegian Red Cross's "Resilience – for real" conference, attended by 300 aid practitioners, academics and business-people, states: "We ensure a broad understanding... Resilience is a useful concept to convene diverse partners to the table. Real action requires that all parties... de-mystify the concept. We actively communicate what resilience is all about – not just within the aid sector but also to the general public" (IFRC, 2015a).

This, then, is important given the limited success of previous efforts to convey what is in essence the necessity to engage in pre-disaster actions at least as much as post-disaster response, and, in doing so, hope to diminish the need for relief in the long term. Previous notable attempts at this (in reverse sequence, and perhaps also in descending order of achieving sufficient traction) have been: disaster risk reduction (DRR); sustainable livelihoods; linking relief, recovery and development (LRRD); and disaster mitigation and preparedness (DMP).

...and convening power

Aid workers, donors, businesspeople and, importantly, politicians are comfortable to stand alongside efforts that build resilience in ways they might not have done so if the rallying cry was a rather more negatively-toned 'less vulnerability'. The word itself has, for the most part, positive connotations (certainly compared to the bleak language of disasters) – synonyms and related words for 'resilience' include 'animation', 'adaptability' and 'flexibility'. This matters, as how issues are framed is vital, because "words are prisons, as well as searchlights and pigeonholes, for what we see" (Manyena, 2006, 436).

Political action has followed. A key activity of the Rockefeller Foundation's *100 Resilient Cities*, an initiative to help 100 cities across the world to "become more resilient to the physical, social and economic challenges that are a growing part of the 21st century" (Rockefeller Foundation, 2016), has been to support a Chief Resilience Officer, appointed to work within respective city administrations in each of the 'resilient cities'.

At a policy level, resilience is here to stay for at least the next 15 years. The 17 Sustainable Development Goals (SDGs), globally agreed at the end of 2015 as the successors to the 2000–2015 Millennium Development Goals (MDGs), comprise two resilience-related goals: Goal 9 to "build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"; and Goal 11, "make human settlements inclusive, safe, resilient and sustainable". The Hyogo Framework for Action (HFA) 2005–2015 concerned "Building the resilience of nations and communities to disasters", while the successor, the Sendai Framework for Disaster Risk Reduction 2015–2030's Priority Three, calls for "Investing in disaster risk reduction for resilience". The 26 necessities listed for achieving better resilience at all levels are wide ranging, covering nearly all aspects of everyday life.

Building relationships for collective action is at the core of IFRC's "One Billion Coalition for Resilience" (described in Box 1.4), an ambitious 'coalition of coalitions' aiming to improve the resilience of one billion people by 2025 (IFRC, 2015). Linked to the outcomes of the SDGs and the *Sendai Framework*, the coalition is aiming to engage with all actors (government, UN, NGOs, academia, private sector and individuals) in activities that include: mapping needs and vulnerabilities; building local and national coalitions; increasing advocacy; and monitoring and evaluating actions.

The Norwegian Red Cross and IFRC's "Resilience – for real" conference also emphasized the need to build multi-sector partnerships and stronger relationships with the business sector. Other recommended needs related to having a strong evidence base of what works, as well as the need for innovation and upholding humanitarian principles.

BOX 1.4 Creating the change needed: the One Billion Coalition for Resilience

The One Billion Coalition for Resilience (1BC) is an unprecedented commitment from individuals, communities, organizations, business and governments. It is a vehicle to mobilize the potential of our collective networks, our shared resources and our ability to work at scale. It is an opportunity to create the change needed in humanitarian response, and to ensure a world where people are safer, healthier and can thrive, even in the face of adversity.

The 1BC is inspired by the experiences of National Red Cross and Red Crescent Societies, led by a diverse group of stakeholders, owned and implemented by those taking action to build resilience. Together, partners will strengthen and expand existing networks, support one another's efforts to build resilience for everyone, everywhere, and implement practical initiatives to address locally-identified risks and hazards, to protect lives and promote development.

Why invest now?

Raising more money to meet ever-increasing need is not the answer. Counting the number of people we reach is no longer a sufficient measure of success. Something must change. The most vital measure of success today is a decline in the need for humanitarian relief, where there are fewer lives to save because the threats and vulnerabilities are reduced.

The world of humanitarian action is at a tipping point, and the 1BC is a mechanism to seed and champion new partnerships, technology and investment models to achieve success.

Evidence shows that building resilience saves money and lives by reducing the financial, administrative and resource burdens of responding to crises. Through collaboration and wise investment, we can reduce the cost of and need for humanitarian relief and response, resulting in fewer lives disrupted or lost due to disaster, conflict and disease. The future of humanitarian action is about driving resilience, where individual dignity is cherished, everyone has the opportunity to thrive, and development gains are protected.

The 1BC is nothing short of the global paradigm shift – called for by the WHS and essential to reaching the sustainable development goals.

FIGURE 1.2 The 1BC vision, goal and measure of success**How does the 1BC work?**

Individuals and organizations join the coalition and take action to build resilience. With every new member, the 1BC will become more effective, drawing from a larger pool of expertise, ideas and participants all working towards a common goal of improved resilience.

Individuals and institutions that are members of the 1BC will be supported by tools to connect to one another, to kick-start initiatives and to break down obstacles to building resilience. At the start, these tools to enable action include:

- 1. Digital ecosystem for public engagement** that connects individuals, organizations, experts and governments to each other and 1BC tools that help them to create opportunities to collaborate and take action to assess risk and design local solutions to build resilience.
- 2. Private sector platform** that provides an entry point for businesses of all sizes to participate in community-level actions that build resilience, and a suite of tools and services for small and medium-sized enterprises to accelerate recovery time from shocks, forge more resilient supply chains, promote stronger linkages to government and communities, and provide greater coverage of potential losses through insurance.
- 3. Civil society organizations' partnership platform** facilitates connection and information-sharing between 1BC partners within communities by increasing visibility, transparency, accountability and capacity, leading to more effective partnerships at the local level, providing important insight into the local networks and community structures that can support building resilience.
- 4. Advocacy platform** enhances the capacity of communities and partners to speak out as one, increasing their influence on decision-makers and opinion leaders to create or change government policies, legislation or practice that promote resilience.

5. Operations platform helps to convert the connections and learning among coalition members to map local risks, design local solutions and implement community initiatives to address the highest-priority risks in their communities.

What does the 1BC offer coalition members?

The 1BC will deliver value to its partners, the IFRC, communities, households and individuals, civil society and the public sector. As a coalition member, you or your organization will have access to the expertise and networks of others. By adapting existing tools and technology and sharing common measures of success, coalition members will drive resources to current projects that are under-reported or ready for scale. You will create and benefit from the collective impact of coalitions at global, national and local levels, reach into remote and difficult-to-access communities, connect to community-level partners, tools and mechanisms for greater visibility, transparency, accountability and impact. ■

Spanning the development-disaster divide

The aid sector has grappled with the development-disaster divide for decades. The separation of long-term actions from short-term response is seen by some as essential, and by others as a deep problem. ‘Purist’ humanitarian agencies argue that combining humanitarian action with developmental challenges, such as engaging in local politics, muddies the waters, and can hamper the primary mission of enacting life-saving responses.

However, the mainstream of aid thinking, for the past 20 years at least, has sought to bring these two sides closer together. *The Grand Bargain*, an agreement between a number of major donors and humanitarian agencies launched at the WHS, commits signatories to, among other things, “enhance engagement between development and humanitarian actors” (UN, 2016, 14). For many, this commitment does not go far enough, but any commitment for humanitarian actors to enhance engagement with development actors is welcomed.

Resilience helps to improve links between disasters and development in two ways. Firstly, a good understanding of resilience confirms that developmental actors need to consider disasters, and engage in efforts to mitigate or even prevent them. Secondly, a ‘resilience approach’ forces emergency response actors to consider time-frames beyond the immediate provision of relief. Decisions made in immediate response can have dramatic effects on long-term recovery, such as in deciding where to locate a relief camp which in time may become a permanent neighbourhood of a city (Davis, 1978).

Aid spending would also benefit from a greater application of resilience-thinking. In a newspaper interview in April 2016, Robert Glasser, the new Special Representative of the UN Secretary-General for Disaster Risk Reduction, argued that aid spending to reduce the scale of future disasters is not a choice but a necessity: “If you see that we’re already spending huge amounts of money and are unable to meet the humanitarian need – and then you overlay that with not just population growth... (but) you put climate change on top of that, where we’re seeing an increase in the frequency and severity of natural disasters, and the knock-on effects with respect to food security and conflict and new viruses like the Zika virus or whatever – you realize that the only way we’re going to be able to deal with these trends is by getting out ahead of them and focusing on reducing disaster risk” (Guardian, 2016).



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Engaging in urban complexity

The understandings embedded within the concept of resilience are helpful for providing insights into the complicated world of urban programming. For instance, a systems approach can help to interpret the complexities of urban space. Within urban analysis, the study of ‘complex adaptive systems’, defined as “dynamic systems able to adapt in and evolve with a changing environment” (Chan, 2001), can be helpful for making sense of chaotic and often contradictory realities. Research after the 2011 Bangkok floods along the Bang Bua Canal, a lower-income neighbourhood that was badly affected, sought to analyse the level of neighbourhood resilience by reviewing three interrelated systems, namely economic flows, governance networks and social dynamics (Sitko, 2016). This research found that it was in the relationship of these three systems through which resilience was evident; e.g., in the ability of local leaders to negotiate with other neighbourhoods, and the use of saved funds and resources to help community members (complex adaptive systems are explored further in Chapter 4).

In other examples, however, urban response still struggles, and a better understanding of what works is needed. A sobering example is provided by the 2015 earthquakes that struck Nepal in April and May, killing just under 9,000 people and injuring more than 22,000, with an estimated economic loss of around one-third of gross domestic product (GDP, Government of Nepal, 2015). Three of the 14 earthquake-affected districts are in the urban Kathmandu Valley. Before the earthquakes, considerable efforts to prepare for the inevitability of such an event had taken place, including the formation of the high-level Nepal Risk Reduction Consortium (NRRC).

Following the earthquakes, one of the most exhaustive Post-Disaster Needs Assessment (PDNA) exercises ever was taken up jointly by The World Bank, UN, European Union, Asian Development Bank and the Government of Nepal. More than 500 persons drawn from these development partners and the Government of Nepal carried out the assessment cutting across 23 sectors and themes. The process, however, remained largely blind to the urban dimension of each disaster. Urban impact as an issue was placed within “Housing and Human Settlements”. Within this, too, it was not known how many of the damaged houses were in urban areas, and thus it was not clear how urban complexities such as multi-storeyed and group housing will be dealt with during the compensation and recovery planning process. This was significant given the facts that 41 municipalities were affected and half of the disaster effects of about US\$ 7 billion was under housing and human settlements (Government of Nepal, 2015).

BOX 1.5 A fairer deal for the most marginalized

Economic growth has lifted millions out of poverty, but deeply-entrenched inequalities persist and are widening between countries and within societies around the world. While no one will be spared the consequences, the effects of climate change are being unevenly distributed, with many of the poorest regions of the world the worst affected. As the gap between rich and poor widens within societies, those who are marginalized on the basis of gender, caste, ethnicity, race, religion, age, ability and other factors become increasingly vulnerable. Their vulnerability is obvious in the denial of rights and equality in many areas of their lives. It is against this backdrop that the SDGs, were accompanied by a rallying call to leave no one behind.

Growing inequality interacts with increased risk. Therefore, disasters and crises are not neutral. Their effects are shaped by social, political and economic systems that drive vulnerability and resilience. Different kinds of inequalities intersect and interact with one another to worsen risk for some individuals and societies. A widowed Dalit woman whose house was destroyed in the 2015 Nepal earthquake faces very different risks from those of a married Dalit woman within the same community. Her vulnerability and experience in accessing support to recover after the earthquake were conditioned by intersecting inequalities based on her gender, caste, marital status and class.

Achieving resilience is an impossible endeavour without understanding inequalities and specific drivers of risk for different groups of people. Like power, the distribution of risk and the extent to which risks are shared in any society is a deeply political issue. This is also true at a global level. Power and wealth allows some people to mitigate risk while directly or indirectly laying it on those with less power or resources to cope. For example, commercial agriculture around rivers in the drylands of Ethiopia and Kenya means that farmers cannot reach water for their cattle, putting their livelihoods in danger (Flintan, 2011). In many societies, gender inequality is a significant driver of risk. In the words of one woman in Yemen, 'The woman is the person who has everything thrown on her head and absorbs all the shocks' (CARE, 2016).

There has been growing attention to resilience in recent years, as is evident from its prominence in the campaigns and strategies of donors and development organizations. This is a good thing. But is current resilience practice helping those who are most marginalized in an increasingly risky and unequal world? Many believe that governments and the aid systems are failing people who face the greatest risks.

Much of the early resilience research and practice took place in the realms of disaster risk reduction and climate change adaptation. It leaned towards a fairly technocratic approach and remained distinct from research and learning in fields such as social protection, chronic poverty, and social change. This early work refrained from using a political lens on poverty and vulnerability and generally did not incorporate power analysis. A recent report (ODI, 2015) on the latest thinking and practice in the field of resilience shows that this is beginning to change with a growing interest in the role of politics and power in mediating resilience processes and outcomes. But is this enough to really make a dent given the scale and inequality of crises and risk? How can programming to build resilience better take into account the complex systems of power and politics that frame inequality and risk?

In longer-term work to reduce vulnerability, there has been some success in understanding and addressing intersecting inequalities and their effects on particular population groups. Work to promote gender equality and inclusive governance is rich with learning about such transformational change, for example by using politically-smart, locally-led approaches. However, much of this work is built on assumptions of activities taking place in stable environments, which is increasingly less the case. As a result, many strategies tend to be somewhat blind to the shifting dynamics of risk. Despite years of mobilizing marginalized groups and supporting collective action to fulfil their rights, many development organizations are unable to support or engage these groups and networks in work meaningfully, to enable them to respond to disaster or conflict at scale. In a world with rapidly-increasing risk and inequality, can work aimed at building resilience improve the ability of development organizations to better understand risks faced by marginalized groups, and cultivate politically-smart strategies that are effective in redistributing risk?

Should the intent of resilience efforts be to cope, or to thrive? Some resilience strategies emphasize resilience as coping or returning to conditions that existed before a shock or stress. For some people who are socially excluded or exploited, returning to how things were before a shock is not a reasonable goal. It means returning to a life of extreme vulnerability until the next crisis. Remaining in limbo for years on end should not be an option for millions of refugees and displaced people. Efforts to support resilience must aim for a higher bar than just coping. Strategies must build on the inherent creativity, aspirations and spirit of resilience in these groups. Our aim must include the reversal of inequality of risk and the fulfilment of rights for all people, especially those who are marginalized, to transform their lives and to thrive.

So, what can we do to support a fairer deal in building resilience for those most marginalized? Rather than simply calling for more inclusive resilience strategies, it may be more effective to *commit to preventing exclusion and inequality* in efforts to strengthen resilience. This would call for unrelenting political will and sustained capability to understand, anticipate and address the dynamics of power, politics and risk across developmental and humanitarian policy and practice. It will require listening better to those who bear an unjust burden of risk, and committing to *addressing the specific barriers that exclude and marginalize particular groups*. Such a commitment can lead to a purposeful agenda of collaboration, learning and accountability to achieve resilient futures for *all* people. ■

The need to act *now*

This chapter has argued that resilience represents the latest incarnation of long-held understandings of what needs to be done. There is no longer a choice: investments pre-disaster must now be taken more seriously, to stem the steady increase in the number of crises. Putting into practice effective resilience lies in the domain of governance, at policy level, where decision-makers across the board – including governments, aid agencies and the private sector – need to take pre-crises actions more seriously. It also lies within communities and civil society, where individuals and neighbourhoods need to be better prepared.

The WHS has been criticized for not achieving reform and for not developing binding agreements. A low turnout of world leaders in sufficient numbers impeded one of the greatest hopes of the Summit: commitments on the prevention of crises through political dialogue. Progress was made elsewhere however, such as in the *The Grand Bargain's* recognition of the need for less bureaucracy, improved transparency, and the endorsement of cash-based programming. One of the strongest commitments is to increase funding for 'front-line' local and national NGOs substantially, from a current estimate of less than 2 per cent to at least 25 per cent by 2020. If achieved, this promises to improve practice, where greater funding is provided closer to where it is needed, and to strengthen Southern-based entities such as the Network for Empowered Aid Response (NEAR), launched at the WHS, to exact more leverage for better actions in the future. The process itself has thrown open a reconsidering of the future of humanitarian action, where, given the challenges ahead, 'business as usual' is not an option.

Further radical rethinking is required, however. The Overseas Development Institute's (ODI) authoritative report *Time to Let Go*, which makes a strong critique of humanitarian aid, argues that three areas need to be addressed. The first is "Letting go of power and control", to the extent that as the current dominant model of aid provision tends "to exclude those who do not act like organizations within the formal system" (Bennett, 2016, 69). The second, "Redefining success", requires a rethink of what is achievable and how, and who measures what success means, the key being a reform of donor actions and incentivizing local response (something which *The Grand Bargain* supports, though, in the view of ODI, not enough). Thirdly, "Remaking humanitarian action" through adopting a people-centred approach, in particular in long-term crises.

This edition of the *World Disasters Report* also attempts to address many of these themes, in the context of resilience. Chapter 2, which examines measurement and evidence, argues that qualitative, participatory approaches offer the best understandings for an approach to resilience that is people centred. Chapter 3's "Time to act: investing in resilience" presents the business case that investing in resilience yields multiple benefits. This includes the benefits a resilience approach yields even when disasters do not manifest – what Rodin (2014) calls the 'Resilience Dividend', which "means more than effectively returning to normal functioning after a disruption. It is about achieving significant transformation that yields benefits even when disruptions are not (manifested)".

Chapter 4's exploration of anticipation, described as "acting on the future in the present", emphasizes the pre-emptive nature of resilience, where "getting better at getting ready" is essential for success. Among other things, the chapter examines the difference between anticipation and adaptation: "Anticipation helps orient human action and emphasizes that people make the future (at least the

immediate one), whereas adaptation helps influence or constrain human action”. Personal resilience in the face of traumatic experience and the necessity of community cohesion is central to Chapter 5’s examination of psychosocial support and mental health – an issue too easily ignored by aid organizations, yet one that if unaddressed can blight the lives of individuals, families and communities for years.

The importance of partnerships and collaborations is examined in Chapter 6, where the case is made that achieving meaningfully resilient societies is a collective effort (as exemplified by the One Billion Coalition for Resilience described in Box 1.4 above). In reviewing the building of Canaan after Haiti’s 2010 earthquake – now that country’s fourth-largest urban area with some 200,000 residents – a powerful example of collective post-disaster recovery is provided, which was led initially not by aid agencies, but by people themselves, working with local grass-roots organizations and private resources.

Finally, Chapter 7 delves into the uncertain world of predictions. In considering resilience in the future, the argument put forward is that singular risks cannot be seen or addressed in isolation, which requires new actors and more innovation. Concerning the latter, the example given in the same chapter on cash transfers argues that using the new modality of cash in humanitarian response not only increases people’s agency but also provides a natural link to the private sector, including banks, retailers and agents.

Resilience, therefore, is here to stay – because it works. As this chapter has highlighted, with current massive need, and with more and greater challenges on the horizon, it is vital that evolving approaches to crises include greater preparation, prevention, transformation, adaptation, transparency and collaboration. A resilience approach provides a means to achieve this.

Chapter 1 was written by David Sanderson, Professor and inaugural Judith Neilson Chair in Architecture at the University of New South Wales (UNSW), Sydney, Australia, and Anshu Sharma, Co-founder and Chief Mentor, SEEDS, Delhi, India. Box 1.1 was written by Jessica F Carlson, Head of Office, Danish Refugee Council and Danish Demining Group, Eastern Ukraine; Box 1.2 by Ilan Kelman, Reader in Risk, Resilience and Global Health at University College London (UCL) Institute for Risk and Disaster Reduction and UCL Global Health Institute, London, UK; Box 1.3 by Jane McAdam, Scientia Professor of Law, UNSW, Sydney, Australia; Box 1.4 by Robert Kaufman, Advisor, One Billion Coalition for Resilience, IFRC, Geneva, Switzerland; and Box 1.5 by Andrea Rodericks, International Development Consultant, Goa, India.

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Proving the case: measurement and evidence

“If you can’t measure something, you can’t understand it”

H. James Harrington

Strengthening resilience has become the priority of most, if not all, agendas for disaster risk reduction at all scales, from the Sendai Framework and international funding agencies’ priorities, to national policies and practitioners’ everyday initiatives. As a consequence, international actors, governmental authorities, National Red Cross and Red Crescent Societies and NGOs have progressively felt the need for measuring resilience in order to prioritize policy approaches and field activity, monitor progress, and foster accountability (Béné, 2013; Levine, 2014). This demand for evidence and measurement has stimulated a flurry of approaches and debates, methods and tools, designed by academic researchers as well as practitioners, to capture the multiple dimensions of resilience at a variety of scales.

What kind of evidence for what kind of measurement?

The diverse approaches to measuring resilience to natural and other hazards, including threats such as diseases, economic shocks and social exclusion, reflect different ethos that are grounded in divergent, often opposing, approaches. Measuring resilience – which originates from different disciplines – can also yield particular complexities (Quinlan, 2015). Each mirrors fundamentally different understandings of disaster and therefore underpins diverse sets of policies and practices to reducing disaster risk. Three approaches drawn from poverty assessments, especially from the work of Robert Chambers (2007) – referred to in the previous chapter as one originator of current thinking in resilience, resulting from livelihood approaches – provide a useful framework for understanding the different ways resilience is assessed in the context of natural and other hazards. These are: the quest for quantification; the vulnerability paradigm; and self-assessment through participation.

The quest for quantification

The quest for quantification mirrors the overwhelming influence of Western science and knowledge (Hewitt, 1983, 1995). Physical sciences, including seismology, volcanology, hydrology and climatology, have had a predominant role in calculating, through diverse forms, the probability of occurrence and magnitude of hazards. In parallel, the assessment of resilience in social science has focused on how

Nepal, December 2015, after the earthquakes. The Nepal Red Cross Society and American Red Cross are undertaking cash distributions in the remote, mountainous village of Lachyang (about 1400m altitude), in Nuwakot district. People here are mostly from the disadvantaged Tamang ethnic group. Their houses are badly damaged or destroyed. In turquoise head scarf, Januka Tamang, who has a son aged 12 and a daughter aged 6, plans to use her money (Rs 10,000, about US\$93) to buy plywood to make doors for the corrugated iron shed they share after the earthquake, for the cold and for security against burglary. Her next priority is blankets. Her husband has been working in Saudi Arabia for 13 years, and was last home 18 months ago. Januka is speaking with Tirtha Raj Joshi, programme coordinator with the American Red Cross.
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people and societies perceive the potential danger and how they adjust to possible threats (Burton et al., 1978). Factors that affect people's resilience are hazard related (i.e., the recentness, frequency and intensity of personal experiences with such hazards). The social dimension of resilience is therefore considered from a quantitative perspective in direct relation to hazards, through the use of related concepts such as 'exposure' (to natural hazards) and indicators and/or proxies such as demographic data.

Quantitative methods to measure resilience tend to involve calculating scores, ranks and indexes. They predominantly look at resilience as an outcome. These somewhat reductionist methods are usually driven by 'experts' who design questionnaires and other extractive tools based on their generalized assumptions of what resilience is. Local people who face hazards and disasters are very often treated as passive respondents of surveys and other censuses. Surveys to assess resilience are conducted in different regions of the world following similar approaches so that the outcomes can be comparable (Chambers, 2012).

This reductionist approach to assessing both hazards and resilience has followed top-down transfers of knowledge, technology and experience from the wealthiest and most powerful regions of the world towards the poorest and less powerful ones. This is because the former are seen to be safer due to their larger and more sophisticated technological and economic resources, while the latter are seen as more vulnerable and unable to cope alone (Bankoff, 2001). From this perspective, disaster risk reduction has therefore long and often been a technocratic process based on the judgement of outside experts. It entails command-and-control initiatives meant to be for the good of those at risk who are often supposed not to be able to make informed judgement as they lack command of the data at stake (Gaillard, 2010). These initiatives include building infrastructure to prevent hazards as well as a wide range of actions (e.g., distribution of posters and brochures) geared towards better informing those at risk by providing them with scientific information to raise their awareness of natural hazards and 'managing' their response to such events should they occur.

BOX 2.1 Quantifying displacement

The risk and impact of displacement on people who are, by definition, “forced or obliged to leave or flee their homes or places of habitual residence” (OCHA, 1998) is most commonly considered as both a manifestation and a cause of vulnerability in terms of human rights concerns and humanitarian needs. It has become increasingly recognized as a development concern in relation to the need for increased investment and efforts to both prevent or minimize displacement as well as to find lasting solutions. Under global policy frameworks for measuring progress towards sustainable development outcomes (UN, undated), disaster risk reduction (UNISDR, 2015) and climate-change objectives (UNFCCC, 2015), displacement is considered to be a driver of risk and a form of non-economic loss. Approaches to the measurement of displacement and its impacts for both operational and policy purposes tend, therefore, to be framed from the perspective of people’s lack of options and a focus on their varied needs for external assistance.

At the same time, displaced populations are people who have used their mobility to survive and to minimize the immediate threat and impacts of disaster. Their own capacities and resources should be enhanced and added to, rather than replaced, as they seek solutions to their situations.

Where people are unavoidably exposed to a threat or disaster, well informed, prepared for and managed displacement can enable people to minimize the immediate risks they face and save lives. This includes the facilitation of emergency evacuations. In this regard, displacement may also be seen as the first stage in a resilient response to disaster.

Quantifying displacement forced by abrupt or incremental change

Displacement in the context of disasters is a global and increasing phenomenon (IOM, 2015). Its scale in relation to disasters brought on by rapid-onset natural hazards, such as floods, storms and earthquakes, has been quantified by the Internal Displacement Monitoring Centre (IDMC, 2016). IDMC’s latest statistics, which aggregate data from 172 countries, show that between 2008 and 2015 there was an average of 25.4 million displacements of people each year – or some 203.4 million displacements over the eight-year period. In 2015, at least 19.2 million disaster displacements occurred – twice the number of new displacements caused by conflict and generalized violence – with 70 per cent occurring in low- and lower-middle-income countries.

Population movements in response to increasingly stressed conditions or slow-onset disasters are more likely to be dispersed over time and less visible than mass movements within short time-frames, as typically seen in rapid-onset disasters. While data and reporting on displacement in these contexts tends to be scarce and it is, therefore, relatively poorly understood, known cases show that significant numbers of people may be affected.

From August 2015 to February 2016, for example, drought impacts on agricultural and farming livelihoods and hunger gradually contributed to the internal displacement of at least 280,000 people in Ethiopia, and the crisis continues to unfold (IDMC, 2016). The distinction between forced displacement and more voluntary forms of movement or migration is less clear in such situations, too. This therefore poses methodological issues for measurement based on these categories and also highlights the fact that forced displacement and voluntary migration are not, in reality, two separate states, but rather exist along a continuum (IDMC, 2016).

Taking the long view: displacement over time

Both incremental stresses and abrupt shocks that bring on disaster displacement are types of change that many populations may increasingly have to learn to live with, particularly in rapidly-growing urban areas and in rural communities dependent on natural resource-based livelihoods and susceptible to the impacts of climate change.

Experience from past evacuations illustrates the importance of sustained or regular data collection over time that allows plans to be adapted to changing or unexpected circumstances. Evacuations in the context of rapid-onset hazard events are typically planned with the assumption that people will be able to return home within a short period of time and to re-establish normalcy quickly. Contingency plans for medium-term shelter tend to be far less prepared for than short-term shelter and assistance, and alternative settlement options for people for whom return is not possible at all can take many years to happen.

Protection and impoverishment risks that weaken resilience tend to worsen over time when displacement is prolonged or when people are subject to frequent, repeated displacement with inadequate time and resources to recover in between (IDMC, 2016). People may remain displaced for years to decades rather than days to months following a disaster, and far more often than is commonly assumed. Obstacles tend to be complex and related to pre-existing vulnerability, marginalization and risk in disaster-prone and fragile contexts (Yonetani, 2015). Research also provides evidence that people may be displaced into high-risk areas, and not just out of them (Foresight, 2011). A key example is the situation where some 60,000 people are still living in deteriorating camp conditions in Port-au-Prince, six years after the 2010 earthquake disaster in Haiti, many of whom are exposed to further hazards such as landslides and flooding (IDMC, 2016).

To promote resilience, evidence is needed on whether displaced people are making progress towards solutions over time. Monitoring should only end once they are safely established back in their former homes or relocated to new ones with full respect for their human rights. Furthermore, evidence should be informed by a long-term perspective on the root causes, historical patterns and cumulative impacts of disaster and displacement. Stronger integration of the concepts of resilience and vulnerability in measurements of displacement and its impacts may enable this. ■

The vulnerability paradigm

The vulnerability paradigm draws upon qualitative methods geared toward providing contextual and rich descriptions of local realities. These have long been used in disaster studies, as well as in other related fields such as poverty alleviation and health, to examine people's response to disaster and more recently to assess their resilience to natural and other hazards. Anthropologists and geographers, in particular, have provided multiple and detailed qualitative accounts of people's resilience that have deconstructed or challenged the centrality of natural hazards in explaining the occurrence of disasters and their impacts (Hewitt, 1983; Oliver-Smith, 1996). Resilience to natural and other hazards is viewed here as a process or an attribute and through the lens of the concept of vulnerability.

Vulnerability to disasters is usually inversely related to the ability of people to access adequate resources and means of protection. People affected by disasters are usually disproportionately drawn from the margins of society and include, depending on the context, children, elderly, people with disabilities, women, and gender and ethnic minorities (Wisner et al., 2012). Vulnerability thus reflects how power and wealth are shared within society and traces its roots to cultural, social, economic and political structures, which lie beyond the reach of those who are vulnerable (Gaillard, 2010). People's vulnerability to natural hazards is context specific and varies in time and space and mirrors the nature, strength and diversity of their everyday livelihoods. It acknowledges, therefore, that all people are different in facing disasters triggered by natural and other hazards, depending on factors such as age, gender identity, physical ability, ethnicity and income level.

Understanding people's resilience to natural hazards through the lens of their vulnerability therefore requires detailed studies relying upon qualitative research methods to better reflect the unique realities of people's everyday lives. These include tools such as semi-structured interviews, life stories, participant observations and focus groups designed to foster interaction between outside researchers/practitioners and local people. The outcomes of such studies are qualitative and difficult to compare from one place to another.

Such methods have led to challenging top-down approaches to disaster risk reduction. They have gained much ground over the past two decades, although their wider adoption has been relatively limited in practice (Gaillard, 2010). In this perspective, enhancing people's resilience can only result from addressing the root causes of people's vulnerability. In consequence, strengthening resilience requires the intervention of those with power in order to grant access to resources to those most vulnerable. Achieving this depends upon a

radical shift in current policies and practices that warrants strong political will to transfer power towards those people who are experiencing disasters triggered by natural and other hazards (Wisner et al., 2012).

Self-assessment through participation

People's self-assessment of their own resilience draws upon the assumption that those at risk, although often marginalized, still display capacities in facing natural and other hazards. These capacities include the set of diverse knowledge, skills and resources people can claim, access and resort to in dealing with hazards and disasters (Anderson and Woodrow, 1989; Wisner et al., 2012). This understanding for instance lies at the heart of the IFRC One Billion Coalition's approach (see Box 1.4 in Chapter 1) where a key measure of success is "the number of people reporting increased awareness of local risks and solutions, as a result of 1BC interventions".

The emergence of the concept of capacities in the late 1980s was strongly influenced by the growing momentum gained by the idea that people, including the most marginalized, should be at the forefront of development in general, and disaster risk reduction in particular, because they are knowledgeable and resourceful (Freire, 1970; Chambers, 1983). Capacities in facing hazards and disasters have provided the rationale for fostering people's participation in disaster risk reduction. Recognizing that people have capacities indeed confirms that they should also participate in enhancing resilience or, as included in many Red Cross and Red Crescent Societies' manuals in the early 2000s, that they should "have more control over shaping their own futures" (Viet Nam Red Cross Society, 2000, 6). This suggests a shift in power relations to the detriment of outside institutions and organizations, including national government agencies.

In consequence, participatory approaches for assessing resilience to natural hazards have gained significant traction amongst practitioners. Today, these are gathered under the umbrella of Participatory Learning and Action (PLA), which is the latest and broader version of what used to be known as Rapid Rural Appraisal and subsequently Participatory Rapid Appraisal. PLA refers to all approaches, methods and attitudes designed to empower those at risk to share, analyse and enhance their knowledge of disaster risk and to plan, implement, monitor, assess and reflect towards disaster risk reduction (Chambers, 2007).

The emphasis on attitudes and behaviour is particularly important here. Indeed, participatory approaches to assessing resilience often put forward tools to produce visual data intelligible to all, including those who may not be able to read, count and write. If these tools are important to bring to mind people's knowledge, they need to be properly facilitated in order to shift power relations at the benefit of those at risk. *To put the last first*, to echo Chambers' (1983) famous saying, the process through

which resilience is assessed is ultimately at least as important as the outcomes of the evaluation.

This understanding suggests that assessing and enhancing resilience is the prime responsibility of those at risk who take the lead in designing the most appropriate disaster risk reduction strategies in the context of their everyday and longer-term priorities. This allows for considering the diversity of people's needs based on issues including age, gender identity, physical ability and ethnicity. Outside stakeholders, including scientists and government agencies, are only to provide external support to sustain people's initiatives and foster the transfer of experiences across spatial scales (Delica-Willison and Gaillard, 2012). These initiatives are often grouped under the framework of 'community-based disaster risk reduction'.

FIGURE 2.1 Using PLA after the Haiti earthquake to assess the quality of recovery



Photograph: David Sanderson

BOX 2.2 Learning from past disasters to build resilient systems

In recent years, there has been significant emphasis on developing metrics for measuring resilience, or, more specifically, on identifying where there is and is not resilience, as a means of determining how to best prioritize investment in building resilience. While this has led to a rise in metrics that are quantitative and categorical, there is still a need for measurements that are more qualitative and are able to flesh out why a system or set of systems may be lacking resilience. In this context, systems can be physical (i.e., infrastructure, ecosystems), human (i.e., people, organizations) and/or political or cultural (i.e., norms, laws and policies).

These different types of systems are tied to each other and constantly interacting; the ability of people to access physical system services is governed by political and cultural norms and rules. Making resilience investments based on isolated information can lead to cascading failures across multiple systems. For example, in many parts of the world, building protection structures is the immediate solution to preventing floods and 'building' resilience without an understanding of how people interact with such structures under a set of norms and rules and how they impact other systems that people depend on. In the Kosi River basin in Nepal, a series of levee (embankment) failures caused catastrophic flooding in nearby communities that had not been prevented from settling in the flood plain behind the levees; these people had a false sense of security that the levees would protect them indefinitely (Moench, 2008).

Addressing this gap requires a lens to understand the social (e.g., wealth/poverty divisions), political (e.g., political instability, inequitable policies), economic (e.g., unemployment) and physical (e.g., land-use change) conditions and stressors that caused a hazard to become a disaster, discern the successes and challenges in managing disaster risk in that context, and to identify opportunities for reducing system vulnerability and increasing system resilience. The Post-Event Review Capability (PERC), collaboratively developed by the research organization ISET-International and the Zurich Flood Resilience Alliance, is one such systematic framework for the analysis of resilience during disasters. This tool focuses on understanding the cross-cutting elements and linkages that truly determine how systems and systems-of-systems function and can fail during a shock. To date, PERCs have primarily focused on floods; however, the PERC framework can be applied to review any rapid-onset hazard or shock.

Conducting a multidisciplinary and cross-sectoral post-disaster review like the PERC not only helps identify lessons learnt and future opportunities for building resilience for a particular location, but it can also help disaster management practitioners, experts and funding agencies to globally prioritize resilience investments, regardless of whether or not a disaster has occurred. All too often, the motivation to invest in resilience is only created in the aftermath of major disasters; however, a growing body of PERC reports (Zurich Insurance Group, undated) indicates that there are common points of failure, weaknesses and success stories across geographies and contexts that people can learn from and use to be proactive in building resilience.

For floods, some of these common lessons learnt include:

- Flood planning is currently conducted in silos, such that resilience investments in one system do not necessarily increase resilience in associated systems; in some cases, this can actually reduce resilience in those systems and cause cascading failures. Flood planning needs to be participatory and integrated with land-use, development and other planning efforts. This is especially important in areas that are at risk of multiple types of hazards. For example, protection structures that are built to prevent floods may fail during earthquakes, with catastrophic impacts on surrounding communities.
- Flood planning is often conducted within administrative or political boundaries (i.e., at the city or community level). However, this planning needs to occur at the basin scale to ensure that upstream activities do not adversely impact downstream risk and vice versa.
- Critical infrastructural systems and other major assets are often located in high-risk zones and/or have not been designed to fail safely. Critical systems need to be modular and with built-in redundancy to ensure that vital services are not disrupted. This includes: spare capacity for contingency situations or to accommodate increasing or extreme surges in pressure or demand; multiple pathways and a variety of options for service delivery; and/or interacting components composed of similar parts that can replace each other if one, or even many, fails.
- Governments (local, regional and national) are increasingly pursuing structural flood mitigation activities. These actions may help minimize flood risk for long periods of time, leading people to forget the risk that floods pose. However, protection structures can fail during severe floods and lead to catastrophic impacts. As a result, governments need to also work to ensure that people continue to pursue adaptation, risk reduction and preparedness activities, and do not forget about their flood risk.
- Recovery is rarely adequately planned for. While progress been made in disaster risk reduction globally, hazards will always have adverse impacts, particularly on marginalized populations. In low- and middle-income countries especially, there is a reliance on international aid to meet this need. Aid is fickle, however. Cities, states and countries need to have recovery mechanisms in place that not only help with early recovery (i.e., immediate core services and needs) but also with long-term recovery (i.e., rebuilding livelihoods) to ensure that people can build back better, rather than return to previous vulnerable states or worse.
- Relationships are key to all aspects of managing disasters and building resilience. Building and maintaining relationships within communities, between communities, between governments and organizations, across sectors, and so on enhances access to resources, services and information, and improves efficiencies in all parts of the disaster management system.
- Risks need to be better communicated to ensure that households and communities work to prepare for disaster and reduce their risk. This includes providing households and communities with up-to-date and unbiased flood maps, and ensuring people understand available financial risk reduction and recovery mechanisms and how to access them.

Flood resilience – and disaster resilience in general – is not only about resource and economic capacity. Although richer nations have more resources at their disposal than low- and middle-income nations, both have similar gaps in their level of resilience. This suggests that there are social and institutional barriers, including perception of risk, regulatory processes, and systemic discrimination, which restrict resilience. For poorer cities and countries, this is good news, as social and institutional changes that promote resilience can be made without great economic input. For wealthier cities and countries, this serves as a reminder that resource and economic capacity is not everything. Money alone cannot prevent a hazard from becoming a disaster. Rather, better planning and regulatory processes, and more equitable policies that minimize the disproportionate impacts of disasters on marginalized populations are needed. Learning from multidisciplinary, cross-scalar and cross-sectoral post-disaster reviews can help identify these entry points for building resilience. ■

Measuring resilience in practice: examples of methods and tools

The past few decades have witnessed the emergence of numerous methods and tools to provide evidence and assess resilience, both as a process and an outcome, in a variety of contexts. These have focused on multiple scales, from the household, organization and ‘community’ (however this is self-defined) to city/province/region and country levels in poor, wealthy, urban, rural, mountainous, coastal, island, landlocked and many other environments. This section does not aim to provide an exhaustive review of all these methods and tools. Instead, it endeavours to illustrate how the three main streams of measurement suggested in the foregoing section materialize in practice (see Table 2.1 below). Further detailed and recent reviews of existing methods and tools are available in both the academic literature, e.g., Ostadtaghizadeh et al., 2015; Beccari, 2016, and policy literature, e.g., Bours et al., 2014; Levine, 2014.

TABLE 2.1 Characteristics of the three main types of approaches to measuring resilience to disasters triggered by natural and other hazards (adapted from Chambers, 2007)

Ethos and principle	Resilience as an attribute/ a reflection of losses	Resilience as a process	Resilience in the eyes of those facing natural and other hazards
Methods	Quantitative	Qualitative	Participatory
Role of outsiders	Data collector	Participant observer	Facilitator
Role of local people	Respondents	Actors of their everyday life	Analysts
Mode	Extractive	Interactive	Self-organizing
Contribution to knowledge	Comparable numbers and indexes	Social and cultural insights	Diverse and local perspectives
Outputs	Tables, graphs, maps	Rich descriptions	Tables, diagrams and charts, maps

Indexes and other quantitative measurements of resilience

As noted above, a large and diverse set of tools for quantitative measurement of resilience has recently been developed. These tools draw upon two fundamentally different assumptions, independently of how resilience is actually defined. On the one hand, resilience is considered through the lens of past and potential losses and thus mirrors the impact of disasters. On the other hand, resilience is viewed as an attribute of people or places. These two different approaches for understanding resilience have led to parallel streams of quantitative assessments. For both streams, data is collected and analysed by outsiders (such as researchers, government officials and NGO staff) and, whenever there are interactions with local people, these are passive respondents of an extractive process.

Assessing resilience based on losses requires an appropriate and reliable dataset, whatever the scale of the analysis is. Data on losses is eventually converted to a range of social and economic indicators through various equations. Indicators are identified through questionnaire surveys and/or secondary data from census organizations, depending on the scale of analysis. The recent attempt by Hallegatte et al. (2016) at measuring the resilience of Mumbai, and subsequently of countries to flooding, is a good example of such an approach. The analysis relies upon an econometric estimation and modelling of consumption and output losses for the whole city of Mumbai, then of its inhabitants' assets and incomes/welfare losses in correlation with their social and economic status assessed through various indicators. The resulting model has eventually been calibrated with household surveys conducted in the city and scaled up to 90 countries. For the latter, resilience was calculated as the ratio between expected asset losses and expected welfare losses (resulting from the loss of assets), in the context of exposure to flood hazards and the latter's return period.

Measurements of resilience as an attribute of people or places are conducted at both country and sub-national levels, be these a neighbourhood, a city or a province, and rely on available secondary quantitative indicators and/or questionnaire surveys. Diverse indicators are used as authorities for the multiple dimensions of resilience and compiled into composite indexes. A large number of variables from census and survey data is usually normalized and standardized, then scaled or weighted and aggregated using various equations. For example, the Community Disaster Resilience Index draws on 75 variables, eventually aggregated into 15 sub-indexes then into the main resilience index at the scale of counties and parishes in the United States of America (Manyunga, 2009). Cutter et al. (2010) follow the same process at the same scale using 36 variables compiled into five sub-indexes contributing to a main Disaster Resilience Index. For both indexes, the results and evidence are ultimately presented as maps of the different counties to visualize their different levels of resilience and to facilitate decision-making

and prioritization of actions towards strengthening disaster risk reduction. A further example, the Climate Disaster Resilience Index, is described in Box 2.3 below.

Other composite resilience indexes designed to reflect resilience as an attribute combine secondary data with primary information to capture more specific dimensions of resilience and tailor measurements to local contexts. Primary data is usually collected through questionnaire surveys; outcomes are eventually translated into numbers. This quantitative data is gathered to capture multiple dimensions of resilience through selected indicators and authorities.

Finally, there are resilience indexes that rely exclusively (or almost exclusively) on primary data to better capture and reflect the views of local stakeholders. Data is usually collected through interviews, focus groups or, more often, questionnaire surveys to provide quantitative evidence that is eventually standardized and pulled together through various equations. The method used by Béné et al. (2016) in measuring resilience in Fiji, Viet Nam, Sri Lanka and Ghana provides an example of such an approach. Gender-disaggregated focus groups are initially conducted with people of different occupations to produce a first set of qualitative data used to design a couple of questionnaires focusing solely on resilience and people's quality of life. The questionnaires provide a set of 34 variables that is eventually aggregated in a model to compute an index of resilience. The results and evidence are presented through tables and graphs crafted to provide explanations for different patterns of resilience.

BOX 2.3 The Climate Disaster Resilience Index for cities

A city is a complex system of different aspects of governance, infrastructure, human activities, business and economic activities, to name a few. The Climate Disaster Resilience Index (CDRI), under the umbrella of Kyoto University, is a unique tool to measure urban resilience, taking into account a city's current risk to city services and systems. The CDRI is a balanced mix of qualitative and quantitative approaches. It consists of five dimensions: physical, social, economic, institutional and natural. Each dimension is made up of five parameters and each parameter consists of five variables.

The CDRI incorporates a participatory method of data collection through strong involvement of the local government officials from different departments. It collects city data on 125 variables, based on a 5x5x5 matrix. For example, for the physical dimension, its five parameters are: electricity, water, waste disposal, infrastructure of roads and infrastructure of buildings. Electricity has five variables: status of interruptions, percentage of city dwellers having legal access to electricity, the city's electric supply authority capable to produce electricity, the city's electric supply dependent on external provision, and the extent to which the alternative emergency electrical supply system can keep emergency services functioning.

The result of the baseline assessment is a mapping of the strengths and weaknesses of a particular urban area. Furthermore, cross-sectoral analyses allow linkages to be drawn between different

dimensions, parameters and variables in the form of correlation coefficients. Once the resilience of all the sectors is identified, the process of addressing potential deficits, in one or the other sector – in the form of participative action planning – begins. The strong character of the CDRI is to enable the local governments to assess their own resilience and prioritize and implement appropriate measures for making cities more resilient to climate-related disasters.

The other characteristic of the CDRI is its capacity for use at various scales. It can be used at the city level as well as in smaller units (district or ward level). The methodology can be used for the neighbourhood level as well, depending on data availability. The CDRI has been developed so that it can be used for the comparison of values of individual cities at the regional, national or city-cluster level (e.g., where the national capital area consists of several cities). The cities can be classified according to their geographic location, such as coastal, mountain, river-side or arid areas. The cities can also be classified based on size, i.e., small, medium, large and mega. The analysis results – overall CDRI values and dimension-based (physical, social, economic, institutional and natural) CDRI values – can be used to characterize cities either based on their size or their geographic locations or both.

CDRI assessment needs to be linked to action planning and prioritization of actions. The process requires a multi-departmental as well as stakeholder involvement, in which actions are prioritized for different dimensions and variables. Action planning was undertaken in eight different cities: Chennai (India), Colombo (Sri Lanka), Dhaka (Bangladesh), Hue (Viet Nam), Kuala Lumpur (Malaysia), Makati (Philippines), Sukabumi (Indonesia) and Suwon (South Korea).

Time series analysis was also carried out in these eight cities in 2010 and 2013. This demonstrates that, while overall resilience for most of the cities has increased over these three years, Hue, Viet Nam, is a city whose resilience has decreased. A closer look on a different dimension shows that, while the city has improved its physical resilience, the natural resilience has decreased significantly over the three-year period. The main reasons for the reduction in natural resilience are: (1) increase of intensity of hazards, (2) increase in frequency of hazards, and (3) land-use change. Thus, it illustrates that, while it is important to enhance city resilience based on infrastructure development, it is equally important to look at the changing pattern of hazards and disasters, and to focus on new and emerging risks. A continuous and periodic monitoring of a city's health in terms of resilience measurement is extremely important.

The CDRI is not just a tool to enhance a city's resilience, but it is also considered a process, which has three specific steps:

1. assessment, which leads to a scenario of city level
2. planning, which leads to the action plan of the cities
3. implementation, which leads to the implementation of actions at city and community levels.

The CDRI was developed and implemented by university and research institutions, in close co-operation with the city governments. The ideal situation of future implementation of the CDRI is to develop the linkage between city governments, local universities and local civil society and NGO networks. There are several regional networks with cities, universities and civil society actors. If the city government obtains technical support from local universities, and implementation support from

local NGOs, it can create a sustainable system for implementing city-specific actions. The networks can help in sharing the lessons and disseminating the experiences across cities, and in identifying good practices for training and capacity building.

The success of the CDRI at the city level depends on the formalization of an action plan, and approval by the city government to enable the use of the city's budget. Mainstreaming risk reduction measures depends on how effectively the actions are linked to the city services, and how effectively the city budget is used to support some of the activities. This process does not take place overnight; it needs time for awareness raising of the city policy-makers, socializing the action plan and creating an enabling environment to ensure that the action plan is approved by the city government. For this, local stakeholders (universities and NGOs) play important roles. Therefore, the CDRI is more than just a tool: it is a process to create an enabling environment of implementing actions at the city level, as well as at the community level.

Qualitative measurements of resilience

There are a number of qualitative approaches for assessing the resilience of people and places. Most of these emerge from the social sciences and try to explore the deep-seated mechanisms that support the process of resilience at different scales. Some are stand-alone studies for the sake of academic research, while others are designed to reflect upon the outcomes of a particular project. Some are geared to inform policy and practice. The myriad of available approaches can roughly be classified into three streams, based on the level of filtering and analysis that is carried out by the instigator. These are summarized in Table 2.1 on page 48.

The first of the three streams comprises raw accounts and stories from people at risk or those affected by disasters. These testimonies are usually collected through extractive tools such as interviews. Such accounts are highly contextual and can barely be compared to each other, although they are often compiled into books or reports to show the diversity of people's experiences and needs in facing disasters triggered by natural and other hazards. Ride and Bretherton's (2011) compilation of testimonies from Indonesia, Pakistan, Solomon Islands, Kenya and Myanmar, for instance, well illustrates this approach. It draws on a series of case studies involving semi-structured interviews conducted in local languages with an average of 11 informants from each country. People's stories of disasters and resilience are eventually reported in a textual format relying on extensive quotes.

The second stream of studies uses a more diverse variety of ethnographic tools, including interviews, life stories and observations, to collect qualitative evidence of people's resilience in facing disasters triggered by natural and other hazards. The analysis of these involves a higher degree of data analysis through a wide range of codified methods that include, for example, content or discourse analysis. Hastrup

(2011) and Simpson's (2013) recent accounts of how people have overcome the impact of, respectively, the 2004 Indian Ocean tsunami that affected Tamil Nadu and the 2001 earthquake in Gujarat, both in India, are excellent examples of this type of assessment of resilience. These studies rely on years of field research that provides time-related bases. They are narrated in text with a particular attention to detail in order to provide a fine-grained analysis of the drivers of people's resilience. This evidence of resilience is also highly contextual and constitutes stand-alone studies that can rarely be compared directly. Instead, they provide the basis for understanding what can be generalized about resilience.

In this regard, the third stream of qualitative assessment of resilience aims at providing proactive frameworks to anticipate and measure resilience in projects concerning disaster risk reduction (as well as in related fields). These frameworks emphasize key and usually broad components of resilience that need to be considered in designing projects and measuring progress. They do not normally refer to particular tools nor do they require any quantitative measurements of any indicators. For example, Buckle (2006) identifies seven factors that support people's resilience in facing disasters triggered by natural and other hazards; these are: knowledge of hazards, shared community values, established social infrastructure, positive social and economic trends, partnerships, communities of interest, and resources and skills. These factors are provided to guide and prioritize practitioners' initiatives towards strengthening resilience.

BOX 2.4 Measuring progress on climate resilience

The measurement of climate resilience is a new and rapidly developing area of research and practice. The need for demonstrating results has led to the creation of a large number of indicator frameworks. Emerging indicator frameworks vary on many dimensions: top-down prescriptions versus community-based consensus; universal or adaptable, sector-specific or cross-sectoral, based on available data or requiring extensive data gathering; and focused on specific hazards and vulnerabilities depending on the context.

The intense debate around indicator frameworks highlights the challenge posed by the concept of resilience to begin with and the different entry points and approaches to defining indicators for climate resilience. Recent reviews of resilience indicators have shown that what counts as an indicator of resilience has been defined and redefined in 'semi-chaotic fashion' according to different interpretations of what the concept means (Schipper and Langston, 2015).

Indicators are important. Without some numerical basis for assessing resilience it would be impossible to monitor changes or show that community resilience has improved. At present, no consistent basis for such measurement exists. Indicators are powerful – 'what gets measured gets done' is, perhaps, the most legendary cliché of performance measurement. Indicators help donors,

policy-makers and practitioners consider climate resilience in projects, plans and in decision-making processes. Indicators are also attractive because they provide a means to score, rank and compare progress between programmes, communities and even nations.

The methodological challenges of measuring progress in climate resilience go far beyond the identification of a specific target. The goals related to climate-related resilience are complex and multidimensional and are not easily susceptible to be captured in simple indicators. Climate resilience is neither a condition nor an ultimate goal; it is a truly dynamic and societal process, progressive and in flux all the time. This poses tremendous challenges for our ability to measure and monitor the impact of resilience-building interventions. Indicators can only tell part of the story (in some cases a very small part).

Yet, practical evidence is needed on what factors contribute to climate resilience, under what contexts and for what types of shocks. The critical challenge is how to capture the complex, context-specific nature of resilience in the face of different types of shocks, without adopting an overly simplistic indicator-based approach. The question thus becomes 'how can we develop monitoring and evaluation methodologies that strike a balance between technical rigour and complexity on the one hand, and practicality and accessibility on the other'? The answer has three dimensions, as mentioned below.

Firstly, the more obvious starting point is to be clear about the different tasks a measurement framework is being asked to fulfil, such as planning, decision-making, learning, accountability. Measuring climate resilience is not an end in itself. The search for the one best measurement is just as futile as the search for the one best way to build climate resilience. Unfortunately, no single performance measure is appropriate for all purposes.

Secondly, any effort to measure progress in climate resilience should seek to maximize flexibility, adaptive management and learning. Measuring climate resilience infers measuring both the capacity of the system to become more resilient (a process of capacity building) and the outcomes resulting from this capacity, i.e., a change of state of being. The difficulty lies in assessing how these processes and outcomes are directly or indirectly linked in order to draw lessons on 'what works' and 'what doesn't work'.

Thirdly, and closely related to the above, anticipating and adapting to changing conditions over time and learning from damaging events to absorb shocks more effectively after the next shock is a continuous process rather than a discrete outcome of a particular investment decision. The unpredictable nature of shocks makes measuring resilience much more difficult and complex than, for instance, measuring poverty, or even indicators such as malnutrition or mortality.

A project currently under way that seeks to monitor progress and measure what works, what does not and why in building climate resilience is called BRACED – Building Resilience to Climate Extremes and Disasters (referred to in Chapter 1). BRACED is one of the world's largest resilience-strengthening programmes in terms of investment, geographical coverage and objectives. The project's monitoring and evaluation system aims to track, measure and understand the processes of change that lead to climate resilience in specific contexts and to specific shocks and stressors across 15 projects operating in 13 countries. It focuses on Pathways of Change: an adapted outcome-mapping approach to measuring change using progress markers across four areas of change (identified as

key processes of change in the programme). These areas are: knowledge and attitude; capacity and skills; decision-making processes; coordination and partnerships. They represent what is often referred to as the ‘missing middle’ in project logframes by illustrating the processes by which project outputs contribute to more meaningful outcomes.

They also pay particular attention to the stakeholders and actors involved in the programme by asking two questions across the four areas of change – who is changing? And *how* and *why* is change taking place? The prevailing context (shocks and stressors, governance structures, stakeholders’ incentives, etc.) is also monitored and evaluated through an *Evaluative Monitoring* approach in order to better understand the extent to which the operating environment enables or constraints progress along the pathways of change (Silva Villanueva et al., 2015).

These suggestions are neither straightforward nor cheap to put into action. Emerging lessons from BRACED tell us that such approaches have resource, time and capacity implications. They can only be achieved with long-term commitment, sufficient planning and training.

There is a need to transform the way in which the collection, analysis and use of evidence for decision-making takes place. Given the newness of resilience frameworks and the scarcity of verifiable evidence of impact among programmes seeking to build resilience, measuring progress should mean shifting the emphasis placed on quantifiable fixed targets. Instead, the focus should be on equipping practitioners with tools and methodologies that can measure and illustrate what factors contribute to resilience (how and why these change over time), on what types of shocks and in what contexts, and on the causal pathways that link project interventions to resilience outcomes. ■

Participatory toolkits and characteristics of resilience

A new set of assessment tools and methods for assessing resilience has emerged and actively been used over the past decade, encouraging more people’s participation in the measurement of what resilience means for them. Participatory toolkits have been designed to cater for people’s diverse needs according to their age, gender identity, physical ability and ethnicity, among other things. In fact, it is likely that, nowadays, organizations active in the field of disaster risk reduction may well have developed their own respective toolkits for assessing and measuring resilience. Certainly, this is the case for the IFRC, as demonstrated by tools such as the *Vulnerability and Capacity Assessment Toolbox* (IFRC, 2007) and the *Participatory Approach for Safe Shelter Awareness* (IFRC, 2011).

These initiatives can be limited, however, given that they draw on predefined assumptions and characteristics of what resilience encompasses, and involve some level of data analysis by those using such tools. To overcome these limitations, Twigg (2009) suggests that predefined characteristics of resilience should be customized and modified. In parallel, the role of outside stakeholders should

only be that of a facilitator supporting local people in collecting and analysing their own data (see Table 2.1 on page 48).

The measurement tool *Characteristics of a Disaster-Resilient Community* (Twigg, 2009) gives space for people at risk to express their own views of what resilience means for them. These characteristics cover five thematic areas broken down into 28 components of resilience, then subdivided into 161 characteristics of resilience. These serve as points of reference or ‘signposts’ to assist practitioners in identifying context-specific evidence and tangible indicators to measure resilience. These characteristics do not suppose the use of any specific tools but rather encourage practitioners to rely upon existing toolkits, including participatory toolkits such as Vulnerability and Capacity Analysis (Anderson and Woodrow, 1989).

Another significant example is *Community-Based Resilience Analysis* (CoBRA), developed by the United Nations Development Programme (UNDP) to assess resilience at the household level (UNDP, 2014). CoBRA uses predefined characteristics and indicators of resilience adopted from the Sustainable Livelihood Framework, such as focusing on natural, physical, social, financial and human assets (Carney, 1998). Data is collected through interviews with key informants and focus groups that make use of participatory tools and thus provide local people with some reasonable opportunity to express their views of what resilience means for them. Nonetheless, the data collected is eventually handled and analysed by external stakeholders to guide and prioritize their activities.

Data collected and analysed through participatory toolkits is usually presented as graphs, diagrams, charts and maps that are accessible to all those who face disasters triggered by natural and other hazards, including the most vulnerable and marginalized who may struggle to read, count and write. The visual dimension of these forms of measurement of resilience aims to overcome cultural and literacy barriers (Chambers, 2010).

FIGURE 2.2 Risk mapping after the Kashmir earthquake, Pakistan

Photograph: David Sanderson

Strengths and shortcomings

All approaches to measuring resilience have their own strengths and shortcomings, which are summarized in Table 2.2 on page 58. Efforts that quantify resilience, as an outcome or attribute, are relatively quick to set up and provide tangible evidence to allow for comparisons across places. They facilitate decision-making and prioritization in policy. Over time, policy-makers and practitioners have become number-savvy to the point that decision-making has often become a matter of juggling with figures and statistics. Numbers and figures further speak to donors and government agencies which call for upward accountability from their funding recipients. Yet, quantitative evidence and measurements of resilience often fail to capture the realities of those at risk, which differ from one household and one place to another. They are also often biased by choices made

by outsiders that include focusing on easily accessible places at favourable times of the year. For this reason, they have been called ‘quick-and-dirty’ (Chambers, 1981).

Such approaches to assessing resilience are currently the most common among aid agencies and researchers alike. Many practitioners, be they the staff of NGOs or local government officials, indeed often feel an obligation to report tangible outcomes of their activities to donors and government agencies. It is therefore appealing to many to quantify increased resilience following a project because numbers and figures particularly are often believed to be tangible. This obligation for upward accountability is deeply entrenched in international donors and national governments’ obsession for accountability that is associated with a whole bundle of strings around the objectives of a project, its time-frame, outcomes and the role of the different stakeholders.

TABLE 2.2 Main strengths and limitations of the three main types of approaches to measuring resilience to disasters triggered by natural and other hazards

Approaches	Strengths	Limitations
Quantitative	<ul style="list-style-type: none"> - Quick to set up - Comparable numbers 	<ul style="list-style-type: none"> - High level of generalization - Biased by outsiders’ choices
Qualitative	<ul style="list-style-type: none"> - Contextual details - Long-term processes 	<ul style="list-style-type: none"> - Time consuming - Hardly comparable
Participatory	<ul style="list-style-type: none"> - Reflects people’s own and diverse views - Addresses actual local needs 	<ul style="list-style-type: none"> - Highly dependent on facilitators’ skills - Hardly comparable
Quantitative and participatory	<ul style="list-style-type: none"> - Reflects people’s own and diverse views - Addresses actual local needs - Tangible to outside stakeholders - Facilitate comparisons 	<ul style="list-style-type: none"> - Highly dependent on facilitators’ skills

Qualitative methods for assessing resilience provide finer-grained views of people’s realities and contribute to capturing less tangible aspects of the process of resilience. They prove especially strong in exploring causalities, including for understanding why people are resilient or not through the overlapping of drivers at different time and spatial scales. On the other hand, qualitative methods have been criticized for taking too long to put into practice, as they can entail long studies that when finalized are often outdated or remain on the shelves of libraries and agencies, and therefore are of little use for policy and practice (Chambers, 1981). Being so location specific, they also prove difficult to be useful in other places.

Participatory approaches, however, have spread broadly within circles of practitioners. These draw on people’s knowledge and skills and foster the participation

of those at risk in both assessing and strengthening resilience, including capturing their diverse views and realities. They further reflect the diversity of people's realities and emphasize downward accountability towards those at risk. Participatory methods are easy to set up and provide a degree of flexibility, but require facilitation skills and experience to encourage genuine participation and transfer of power. However, the process can be 'facipulated' (a mix of facilitation and manipulation) and skewed to serve the interests of outside stakeholders who need to justify the 'involvement' of locals in activities they have designed beforehand in a typical upward accountability fashion (Cooke and Kothari, 2001). In addition, participatory approaches to measuring resilience are frequently distrusted by policy-makers who struggle to make sense of highly context-specific evidence. Participatory assessments of resilience are also often disconnected from formal initiatives led by government and science.

The foregoing review of approaches for assessing resilience therefore depicts a landscape where the three different methodologies described operate mostly – but not always – in silos. This is unsurprising as all reflect diverging, if not opposing, ideologies supporting not only the assessment of resilience but also broader strategies to reduce the risk of disaster. In this sense, there remains a gap that proves detrimental to policy and practice.

Ultimately, measuring resilience should rely on a combination of methods. Mixed-method approaches are, indeed, increasingly encouraged in disaster studies and disaster risk reduction (Maxwell et al., 2015). Combining different approaches provides an opportunity for harnessing the best of all methods and tools and, at the same time, making up for their limitations. However, integrating the processes and outcomes of quantitative, qualitative and participatory approaches remains a challenge.

In this regard, there are specific tools that may help in bridging the gap between the array of methods designed for assessing resilience. Such methods include subjective resilience surveys (Jones and Tanner, 2015). These are short questionnaire-based surveys with closed-ended questions designed so that those at risk identify factors that contribute to their own household resilience and eventually rate their relative importance. These surveys are geared towards providing tangible and comparable assessment of resilience across different places. They are meant to be quick to set up and easy to analyse.

Other innovative methods include *Quantitative Participatory Methods* (QPM) to generate what is known as participatory numbers (Chambers 2003, 2007) or participatory statistics (Holland, 2013). Participatory numbers are “quantitative research information produced by those at the forefront of everyday development struggles, i.e., the poor and marginalized who are usually excluded from mainstream

research initiatives supposed to assist in lifting their well-being” (Gaillard et al., 2016). QPMs allow for the attribution of a ‘value’ to the qualitative and often intangible dimensions of people’s resilience in facing disasters triggered by natural and other hazards. They draw upon a participatory process where local people define their own indicators and then analyse and monitor these themselves. Participatory numbers produced are thus more likely to reflect people’s realities while providing some tangible evidence for comparison and scaling-up to inform decision-making beyond the place where numbers are produced. Their visual strength compared to the use of words and text further overcomes language, cultural and literacy barriers (Chambers, 2010). As a result, QPMs facilitate the participation of those generally excluded from research and projects designed to assist them in strengthening their resilience.

BOX 2.5 Building evidence for risk-based insurance

Improving societal resilience in the face of the growing cost of disasters triggered by natural disasters and how to do so in a fair and affordable manner is an increasing challenge. Many governments are looking to insurance as a partial solution to this problem.

Insurance is a contract between a policy-holder and a company that guarantees compensation for a specified loss in return for the payment of a premium. Conventional insurance works by pooling risks, an approach that works well for car accidents and house fires but not for the spatially-related nature of losses from disasters caused by natural hazards. It is the global reinsurance market that ultimately accepts much of this catastrophe risk (Roche et al., 2010). Relatively new financial instruments such as *Catastrophe Bonds* and *Insurance-Linked Securities* are also being employed to transfer some catastrophe risks to the capital markets.

Insurance is part of the essential infrastructure of a developed economy but it would be a mistake to see it as an instrument of social policy. It cannot in itself prevent flooding or earthquakes. On the other hand, insurance can promote socially desirable outcomes by helping policy-holders fund their post-disaster recovery more effectively. The greater the proportion of home-owners and businesses having insurance against naturally-triggered disasters, the more resilient the community will be.

Insurers can also help promote risk awareness by property owners and motivate them and communities, as well as governments, to take mitigation actions to reduce damaging losses (McAnaney et al., 2016). The mechanism for doing this is by way of insurance premiums that properly reflect risk. Insurance is not the only means of providing transparency on the cost of risk, but private insurers are the only ones with a financial incentive to acknowledge such costs. Moreover, they are the only entities that can reward policy-holders when risks are reduced (Kunreuther, 2015; McAnaney et al., 2016).

It is in the interest of communities to have a viable private sector insurance market and, arguably, governments should only become involved in the case of market failure (Roche et al., 2010). Of those government-authorized catastrophe insurance schemes examined by McAneney et al. (2016), many are actuarially unsound and end up creating a continuing liability for governments, and/or, in not pricing individual risks correctly, they encourage property development in risky locations while failing to provide incentives for retrofitting older properties at high risk. In less-developed insurance markets some government involvement may encourage the uptake of insurance (e.g., Tinh and Hung, 2014).

How do we assemble the evidence to support risk-reflective insurance premiums? New technologies such as catastrophe loss modelling, satellite imagery and improved geospatial tools are proving helpful in allowing insurers to better understand their exposure to natural hazard risks. While these technologies are increasingly available, in some countries the normal outcomes of such data gathering and analysis – insurance premiums – are constrained politically. This is the case in the United States of America where there has been a tendency to keep premiums low across the board and to have policy-holders in low-risk areas cross-subsidizing those at higher risk (Czajkowski, 2012). Such practices do little to constrain poor land-use planning decisions that lie at the heart of many disasters triggered by natural hazards (e.g., Pielke Jr et al., 2008; Crompton and McAneney, 2008). McAneney et al. (2010) show that most of the homes destroyed in the 2010 Black Saturday fires in Australia were located very close to fire-prone bushland with some 25 per cent actually constructed within the bushland. Effectively these homes were part of the fuel load and their destruction was unsurprising.

One way to build a wider evidence base for collective action to support risk-based insurance policies is for governments to share information on risks of disasters related to natural hazards, both with insurers as well as the community. This information might be hazard footprints as well as the likely cost of the damage (The Wharton School, 2016). In Australia, governments have been reluctant to do this. In some developing insurance markets, home-owners or farmers may have a better understanding of the risks than do insurers, who will price this uncertainty into premiums. Unrestricted access to hazard data for all parties would encourage fairer insurance pricing.

Gathering hazard data for building evidence for risk-reflective premiums depends on the type of hazard. For example, the distance of buildings from fire-prone bushland or the local likelihood of flooding are key determinants of vulnerability to these location-specific hazards. In other areas, or within the same areas in some cases, the annual likelihood of exceeding damaging levels of seismic ground-shaking, wind speed or volcanic ash are important metrics, as are distance from the sea and the elevation of a property when it comes to coastal hazards like tsunami and storm surge.

When this risk evidence is established and becomes reflected in national construction standards, improvements in resilience follow. For example, improvements in construction standards introduced in Australia after the destruction of Darwin by Tropical Cyclone Tracy in 1974 have been credited with reducing subsequent losses from tropical cyclones by some 67 per cent (McAneney et al., 2007).

The availability of such data may result in reductions in some insurance premiums, an increase for others, or, in extreme cases, the withdrawal of insurers from areas where the risk is considered to

be too high. The latter outcome will send a strong signal to communities and government for investments in mitigation; subsidized insurance is not the answer. Governments should also ensure that humanitarian aid provided after disasters is targeted effectively, in order to avoid creating disincentives for people to purchase insurance.

Lastly, and to return to the issue of poor land-use planning, it is worth remembering that the 1945 thesis of the famous American geographer, Gilbert White, that “Floods are an act of God, but flood losses are largely an act of man”, still rings true and applicable to a wider range of disasters triggered by natural hazards than just floods. ■

Whose resilience is measured, by whom and for whom?

There is a consensus that measurements of resilience are needed to prioritize actions for disaster risk reduction and other fields, monitor changes, whether for the better or the worse, and to make agencies that claim to work towards strengthening resilience accountable to their donors (Béné, 2013). Such calls make sense in the context of present policies and practices for disaster risk reduction. Therefore, measuring resilience constitutes a pragmatic response to those needs.

However, asking whether resilience can be understood begs the broader question of power and power relations in disaster risk reduction. In other words, whose resilience is measured, by whom and for whom? Do those who are facing disasters triggered by natural and other hazards need their resilience to be measured, especially by outsiders, and who is benefiting from such measurements? For many, resilience remains a poorly-defined Western concept with a Latin origin. Thus, it rarely translates in non-Latin languages and attempting to capture and/or measure whatever it means in the eyes of Western outsiders may just, most often inadvertently, satisfy the appetite of the latter more than answer a local need. As Bhatt (1998, 71) so eloquently put it in the context of vulnerability, another concept of Latin origin, an outsider is likely to be “filtering what she or he reads through the conceptual framework, assumptions, and values of her or his culture and, as a result, is creating false ‘stories’ that fit her or his expectations”.

Groupings are problematic also, where the individual can become lost. All measurements of resilience, including those at the household level, involve and accept some form of generalization that fail to appraise people’s diverse views and realities. Those people and places whose resilience is measured are therefore seen as “indistinguishable from one another, as controllable, homogenous objects of study who can be reduced to generalized data and explained” (Bhatt, 1998, 71–72).

Overcoming such obstacles in measuring resilience ultimately requires mixed-method approaches for pulling together ‘the best of all worlds’, to expand an expression coined by Barahona and Levy (2007). Measuring resilience indeed needs

to reflect the views of those at risk but, at the same time, speak to outside stakeholders who may provide support to strengthening resilience (Jones and Tanner, 2015). In future, it has to be tangible to both insiders and outsiders while providing enough detail to capture the multiple dimensions of resilience as both a process and an outcome. In this respect, existing and innovative methods and tools such as subjective resilience surveys or QPMs and participatory numbers provide an opportunity to integrate quantitative, qualitative and participatory approaches to measuring resilience in a way that is accessible, perceptible and acceptable to all.

Chapter 2 was written by J C Gaillard, Associate Professor, School of Environment, The University of Auckland/Te Whare Wānanga o Tāmaki Makaurau, New Zealand, and Rohit Jigyasu, UNESCO Chair and Professor, Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University, Kyoto, Japan. Box 2.1 was written by Michelle Yonetani, Senior Advisor, Disasters, Internal Displacement Monitoring Centre (IDMC), Norwegian Refugee Council, Geneva, Switzerland; Box 2.2 by Kanmani Venkateswaran, Research Associate, ISET-International, and Karen MacClune, Chief Operations Officer and Senior Staff Scientist, ISET-International, Boulder, Colorado, USA; Box 2.3 by Rajib Shaw, Professor and Executive Director, Integrated Research on Disaster Risk Programme, International Council for Science, Beijing, China; Box 2.4 by Paula Silva Villanueva, Director, ResilienceMonitor, Vitoria, Spain; and Box 2.5 by John McAneney, Professor and Managing Director, and Andrew Gissing, Director, Government Business and Enterprise Risk Management, Risk Frontiers, Macquarie University, New South Wales, Australia.

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Time to act: investing in resilience

“An ounce of prevention is worth a pound of cure”

Benjamin Franklin

The shift in focus from relief and rehabilitation to more anticipatory forms of disaster risk reduction and management has made significant progress in recent decades. The major international policy frameworks agreed in 2015 and 2016 mentioned so far in this report all highlight the importance of investing in resilience. Such international agreements and processes highlight how resilience as a concept can help integrate different risks and sectors.

However, despite the policy-based progress in disaster risk reduction (DRR) and climate change adaptation, overall investment remains relatively low and the costs of disasters continue to rise (World Bank, 2012; UNISDR, 2015). Both the number of disaster events and their related economic and humanitarian losses have been increasing steadily since the 1980s. Economic losses from extreme weather events are now in the range of US\$ 150 – US\$ 200 billion annually, with an increasing share of damages located in rapidly-growing urban areas in low- and middle-income countries (GFDRR, 2015). The adverse impacts of climate change – extreme weather events, climate variability and uncertainty – are a significant threat to livelihoods, and restrict equitable growth and sustainable development.

Public finance for disaster resilience

A wide range of different actions can contribute to enhancing disaster resilience at a variety of scales, which complicates the estimation of total levels of financing and effort. International financial flows for DRR were at the heart of debates leading to the development of the *Sendai Framework*, but there is also growing domestic and private sector financing, particularly as a result of the increase in national disaster management funds and awareness of risks by businesses. This reflects the move away from seeing DRR as an externally-financed add-on activity and towards an approach that builds into development processes greater capacities to anticipate, absorb and adapt to risks.

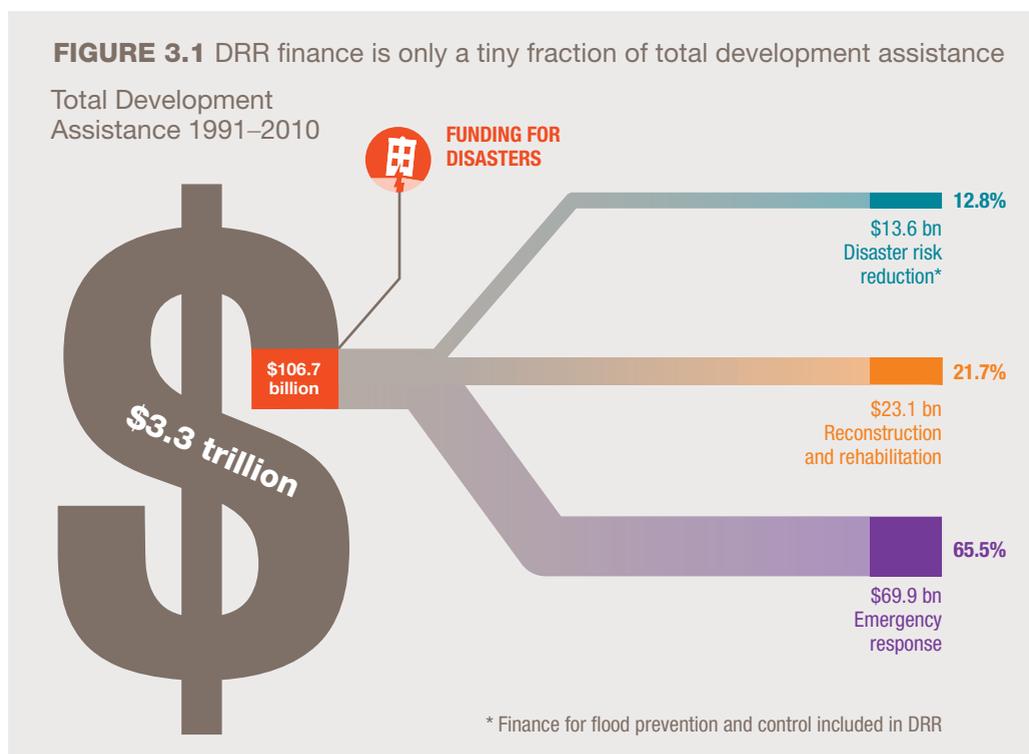
International investment in disaster resilience

Over a 20-year period (1991–2010) there has been US\$ 13.6 billion of international financing spent on DRR (at constant 2010 US\$). By way of comparison, even low estimates that only consider the direct impacts of disasters show that the 8,652 recorded disaster events in poorer countries between 1991 and 2010 caused

Leyte, the Philippines, April 2014. About 90,800 families and individuals were helped with the equivalent of US\$ 110 emergency cash relief in the Haiyan operation.
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US\$ 846 billion of financial losses. Crucially, the majority of this spending on disasters occurs after the events. Data for disaster-related activities can be broken down into three categories: DRR (including flood prevention and control); emergency response; and reconstruction and rehabilitation. From the majority of finance allocated to disasters, US\$ 69.9 billion (65.5 per cent) flows to emergency response, US\$ 23.1 billion (21.7 per cent) covers reconstruction and rehabilitation, while only US\$ 13.6 billion (12.8 per cent) is spent on anticipatory (i.e., pre-disaster) DRR (see Figure 3.1; Watson et al., 2015).

Total development assistance for disasters constitutes a small fraction of the US\$ 3.3 trillion total international aid finance, and the US\$ 13.6 billion spent on DRR accounts for just 0.4 per cent of the total amount spent on international aid. Essentially, for every US\$ 100 spent on development aid, just 40 cents was invested in defending that aid from the impact of disasters. For example, Pakistan has received significant disaster funding (US\$ 5.9 billion, or 5.5 per cent of total global funding on disasters). Yet, despite the considerable impact of a range of disasters in this country, only US\$ 161.5 million of this has actually been spent on DRR. During the same period, however, massive amounts have been spent on response (US\$ 3.3 billion or 55.2 per cent of the total) and on reconstruction and rehabilitation (US\$ 2.5 billion) (Kellett et al., 2014).



Source: Watson et al., 2015

In terms of distribution, there is a high concentration of funding in a relatively small number of middle-income countries. The top 10 recipients received almost US\$ 8.0 billion of DRR finance during 1991–2010, while the remaining 144 countries received just US\$ 5.6 billion combined (Kellett et al., 2014). Similarly, the scale and frequency of disaster impacts in fragile and conflict-affected states is not mirrored by the investment provided or political priority given to DRR by international donors; between 2004 and 2014, 58 per cent of disaster deaths and 34 per cent of people affected by disasters have occurred in countries that also appear in the top 30 of the Fragile States Index (Peters and Budimir, 2016).

International financing for DRR is increasingly being channelled through climate-change adaptation funds; between 2002 and 2014, 13 per cent of total multilateral adaptation finance (US\$ 405 million) was categorized as disaster prevention and preparedness, with wider effective adaptation actions themselves also contributing to enhanced resilience. The development of new funds is likely to improve international investment flows for resilience, including through the Green Climate Fund (GCF) under the UN Framework Convention on Climate Change, which has received public sector pledges of more than US\$ 10 billion. In contrast to DRR through international aid, funding for DRR through adaptation funds has shown to be more focused on low-income countries. This is illustrated by the large amounts approved for DRR by adaptation funds such as the Least Developed Country Fund (US\$ 147.67 million) and the Pilot Program for Climate and Resilience (US\$ 187.99 million) (Caravani, 2015).

Domestic finance for disaster resilience

At national level, a range of disaster risk and climate adaptation financing mechanisms is emerging that are boosting investment in resilience. In particular, there is growing engagement of ministries of finance, with disaster resilience given as part of their responsibilities for economic, financial, fiscal and budget policy-making, planning of public investment and coordinating public expenditures (Gordon, 2013). Domestic DRR is financed through three main channels (Kellett et al., 2014):

1. As part of a larger disaster risk management budget that includes preparedness, response and sometimes recovery. This usually requires management by a single governance structure, such as a national disaster management agency
2. As a budget line or special fund targeting DRR needs as a first priority
3. Integrated into development planning and management, where risk is incorporated into sector plans and management (whether explicitly or without a specific disaster label).

Data on national spending on DRR remains very uneven. However, recent analysis in Ethiopia and Uganda suggests that domestic finance comprises 80 per cent and 91 per cent (respectively) of climate finance flows. Uganda's ambitious goals are set out in the country's national climate change policy, with the majority of Uganda's climate change-related expenditure concentrated on adaptation activities and, in particular, disaster preparedness and management. This includes the development of a national early-warning system to provide information on crop production and climate-related disasters (Bird et al., 2016).

In Bangladesh, climate-related actions formed 5.5–7.2 per cent of government expenditure in 2010–2011. Thirty-seven out of 57 ministries or divisions had climate-relevant spending; this demonstrates a shift towards mainstreaming climate considerations into domestic policy and budgets. In 2010–2011, the Ministry of Disaster Management and Relief spent 15 per cent of the domestic climate finance in this country (UNDP, 2015).

In the Philippines, domestic climate finance has increased by 26 per cent annually, reflecting the heightened concern for climate change. Resilience-building efforts have seen conceptual and policy convergence through the relationship between the Climate Change Act and the National Disaster Risk Reduction Management (NDRRM) Acts. The national and local Disaster Risk Reduction and Management Funds also display a shift towards resilience building through dedications of 70 per cent of funds to disaster prevention activities and 30 per cent to support Quick Release Funds for relief and recovery programmes (UNDP, 2015).

BOX 3.1 Making innovation work for resilience

Resilience is of increasing importance for communities, societies and economies around the world. Long framed as a means of ensuring interconnected systems can mitigate, cope with and even flourish in the face of future growing uncertainties, it has moved to the front of policy debates largely as a result of the last decade of unanticipated global crises. Policy-makers, practitioners and scholars alike point to the need to strengthen resilience at multiple levels from a global planetary perspective through to local communities, and everywhere in between.

As with any idea or concept that quickly captures the zeitgeist (the defining mood of a particular period of history), there are still questions and ambiguities about what resilience means, how it can meaningfully be operationalized, and how best to achieve it with minimal resources. There are many frameworks and tools that have been developed and are being used (see Chapter 1) to make this more effective.

In recent years there has been a growing awareness that resilience cannot be strengthened using existing practices alone. There is a need for novel and original approaches to be tested and applied.

This has involved the widespread use of a range of technologies, with rapid growth especially notable in the application of digitally-enabled innovation as a means of strengthening the building blocks of resilience. These include:

- digital hardware innovations – using everything from mobile phones to drones and satellites – to allow for better, more detailed analysis and tracking of shocks, stresses and impacts
- network innovations, enabled by social media tools and social networks for facilitating better collaborative working before, during and after crises
- data innovations, focusing on better use of real-time, as well as big and open data approaches to enable more adaptive and responsive decision-making and planning.

However worthwhile, this focus on the latest technologies has often been to the neglect of the political and institutional contexts within which innovation occur, and upon which resilience fundamentally depends. As a recent review by the Centre for Internet and Society (McDonald, 2016) found, such efforts “invite the problems of digital systems into the most fragile and vulnerable environments in the world”. Three in particular stand out, as outlined below.

The first is narrow technocratic solutions. There are already concerns that much resilience work leads to risks being thought about, anticipated and planned in highly narrow and simplistic fashion. In the extreme, this means siloed responses to the risks that are most obvious and easily visible (such as flood barriers for floods, fire safety for fires, generators for power failures), instead of integrated approaches that seek to deal with the possibility of cascading or total system failure. Innovation for resilience, despite the promise to enable new systemic approaches, tends to sit within these silos rather than disrupting them.

There can also be a tendency to assume that information will be sufficient to build resilience. This is a long-standing challenge – a review of food security resilience in the 1990s highlighted the prevalent mentality of ‘let them eat information’. This is problematic, precisely because an information focus allows the technical aspects to come to the fore, to the neglect of institutional and structural changes. International organizations have long been acknowledged for focusing on the immediate and technical responses to the neglect of structural challenges around vulnerability. In the extreme, resilience innovation can provide a new, technologically-sophisticated way of reinforcing this behavioural and institutional pattern.

The second issue is inequality of access and opportunity. While new technologies have been disseminated widely around the world, the most recent data suggests that there are still deep inequities. The World Bank’s *World Development Report on Digital Dividends* shows that four billion people around the world still have no access to the Internet while a further two billion have no access to any form of digital technology, even basic mobile phones (World Bank, 2016). It will be no surprise that these groups are also the poorest, most marginalized and therefore the most vulnerable. Digital technologies, even when they do see dissemination, also tend to lead to an increase in inequality in some key ways: through ‘winner takes most’ market dynamics, the dominance of elite groups’ voice and accountability, and through the use of technologies to diminish already marginalized groups actively.

The third issue concerns ethics, privacy and security. The use of digital tools in disasters has been based on major underestimations of the privacy and legal implications – data is often shared illegally and without user consent and the governance of emergency powers over digital systems remains poorly defined and badly regulated. This is especially apparent in the growing calls for mobile network operators – the companies that provide mobile phone and related data services – to openly share their databases, which usually contain a significant amount of personal information. We simply do not have a sufficient understanding of how to apply these records to social services systems – even less so in fragile and vulnerable contexts. With specific reference to Ebola, the crisis was judged by McDonald (2016) as a ‘big data disaster’ precisely because of the highly experimental approach that was undertaken without due consideration of basic human rights and humanitarian law.

For truly meaningful innovation that builds resilience and avoids the three risks set out above, there is a need, therefore, for effort to be paid to both the technical and the institutional dimensions of resilience. This means thinking about not just the mechanisms of international and national responding organizations but also the wider governance frameworks of which they are a part, and that fundamentally shape preparation for and responses to crises. These include social protection systems, safety nets, the civil service, procurement mechanisms, public financial management systems, civil society and the media, just as a starting point. To put it bluntly, innovations that do not take the institutional context into account are not worthy of the term.

Without addressing the institutional blind spot, resilience innovations will be at best technocratic, short-lived and unsustainable, and, at worst, will do more harm than good. However, if resilience is used not as a means of driving programmes but of fostering more inclusive national reform agenda, governments and other institutions will be better able to deal with risks and crises facing their population as well as to gain legitimacy and capability in the eyes of their citizens. ■

Private sector investment in building resilience

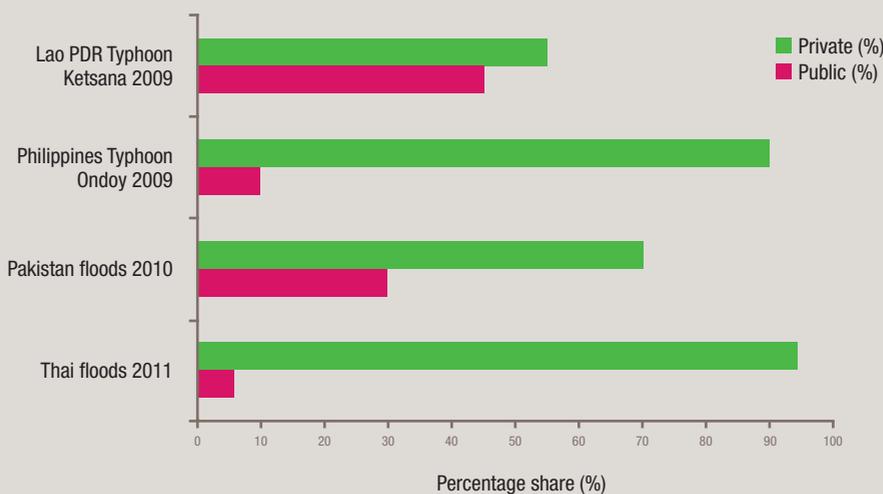
Awareness of disaster and climate risk is growing in the private sector. Businesses and governments ranked the ‘failure of adaptation measures’ as one of the top five global risks with highest impact in the 2014 *World Economic Forum Survey* (WEF, 2014). Given its role in investments, services and built infrastructure, the private sector has a huge influence over the exposure and vulnerability of human and environment systems to disasters. Therefore, there are huge potential gains from involving businesses in resilience-building processes, both for the profitability of the businesses themselves and for the wider well-being of people and the planet. While data on business investments in resilience is not registered and trackable in the same way as development finance, there are growing examples of companies adapting their operations to take into account climate- and disaster-related risks (Crawford and Seidel, 2013).

Business losses from disasters

Businesses and their assets commonly bear the majority of economic impacts of disasters (see Figure 3.2). Although direct impacts on assets or physical infrastructure often receive the greatest attention in post-disaster reporting, such economic losses are often exceeded by indirect impacts to flows of goods and services (Rose, 2014). The 2011 Thailand floods hit the manufacturing industry hard, particularly in the production of transport equipment (reduced by 84 per cent) and information and communications equipment (reduced by 73 per cent). Impacts were substantial on the supply chains of some of the world's largest manufacturers, such as Toyota, whose production was slowed in eight different countries (Avory et al., 2015).

The 2004 flooding in Bangladesh's capital, Dhaka, decreased production in the garment factories that support the country's export-led growth. Floods affected the factories directly but also prevented staff, who often live in the city's highly-populated low-lying areas, from accessing their workplace, increasing production losses (Alam and Rabbani, 2007). Employee sickness through waterborne disease and the inability to reach work was estimated to cost the country's garment industry US\$ 3 million per day (PWC, 2013). Wider macroeconomic impacts on factors such as overall GDP, employment, consumption, or inflation affect business through reduced sales and increased production costs as well. Post-disaster reconstruction and rehabilitation can stimulate and increase business, but there is little evidence to suggest these offset disaster losses (Hallegatte et al., 2016).

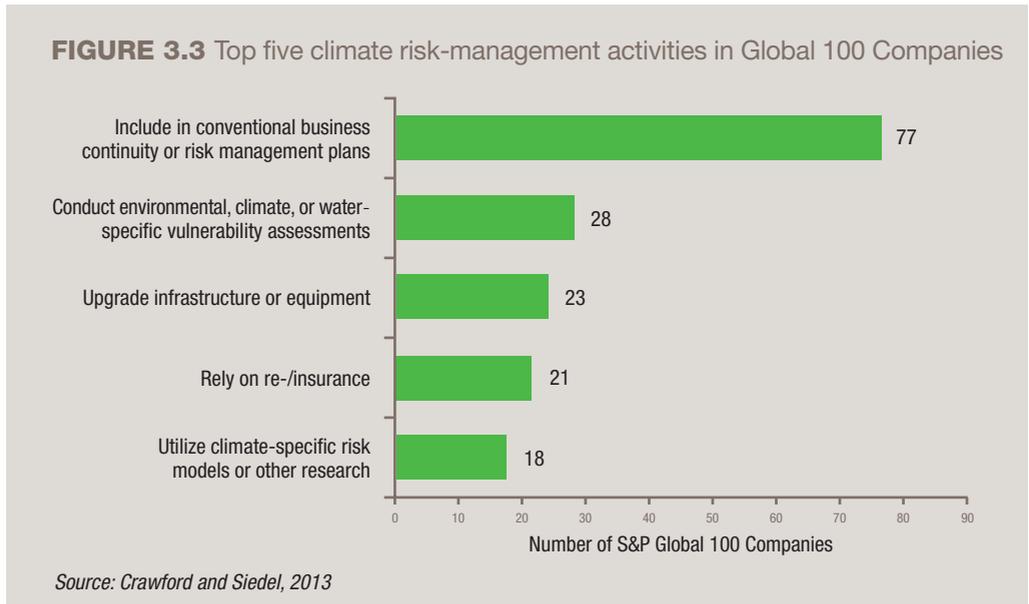
FIGURE 3.2 Disaster losses incurred by the private vs public sectors



Source: Economic and Social Commission for Asia and the Pacific and UNISDR, 2012

Drivers of business investment in resilience

Business continuity is a critical driver of action on resilience, as illustrated by the 2011 Bangkok floods. Growing engagement in global value chains means that protecting physical assets *in situ* must be combined with greater consideration of the resilience of supply chains and enabling business continuity in the face of external shocks. Some companies may also seek to support other, often smaller, companies in the value chain to build resilience. In addition, small businesses are drawing on business associations and chambers of commerce for knowledge on disaster and climate-change risks (Karanth and Archer, 2014; Bahadur and Tanner, 2014). A survey of international businesses in Standard & Poor's Global 100 Companies suggests a range of risk-management strategies exist (see Figure 3.3) but that these responses may not be incorporating changing climate risk (Crawford and Siedel, 2013).



Business opportunities are driving private sector investment in resilience, too. Resilience-building can both stabilize existing markets and develop new opportunities, such as supplying resilient infrastructure, providing risk information, or developing new technologies (Jha et al., 2013; Intellectap, 2010). There is also a growing demand for building resilience into commonly contracted-out public utilities such as energy, telecommunications, transport, water and wastewater systems that are contracted out to private sector firms. Some market opportunities where products can be delivered at scale will favour large companies. However, the case-specific nature of vulnerabilities and opportunities for resilience-building may favour small and medium-sized enterprises or community-owned companies (see Khattri et al., 2010, for examples in urban areas).

Governments can create enabling environments to drive private-sector investment decisions through planning, policy incentives, regulation and knowledge sharing. Firms may be motivated to invest in resilience for legal compliance with building codes, regulations or commercial restrictions (Bosher and Dainty, 2011). Supportive policy measures include: changes to business, sales and property taxes; rebates to promote the installation of resilient features such as flood-proofing or information technology back-up systems; subsidies, grants and soft loans; and financial aid following a disaster itself (ADPC et al., 2013).

Governments can also facilitate the exchange of knowledge on climate risk information, fund research and development on resilience solutions, and support public-private-partnerships (PPPs) that encourage resilience-building, particularly where outcomes are public goods (Watson and Kellett, 2016). Capital finance may drive future investment in resilience in both private and public sectors too, with rating agencies warning that levels of resilience are likely to be increasingly important in determining access to credit due to climate change and growing disaster losses (Standard & Poor's Rating Services, 2015).

Crucially, different mechanisms may be needed to engage with small and medium-sized enterprises or community-owned companies, where the informal economy may dominate and where enforcement and compliance with formal regulations are often much weaker. For example, efforts to enhance infrastructure resilience in Da Nang city, Viet Nam, has developed the skills of local masons in informal settlements, who operate largely outside of formal regulatory systems (Tran et al., 2014).

BOX 3.2 Insurance and resilience: the Zurich Flood Resilience Program

Floods are a growing concern. Globally, floods account for more losses than all other natural hazards combined. The number of flood disasters nearly doubled in the decade from 2000–2009 compared to the previous decade. Zurich is well aware of the financial burden of disaster losses, and with the prominence of floods increasing all across the globe, it launched the Zurich Flood Resilience Program in 2013.

Key to the programme is resilience. In this context, resilience helps to shift the focus of what needs to be done before a disaster occurs. The concept of resilience has the potential to unlock novel strategies for managing risk and promoting development at the same time.

It has long been recognized that it is more cost effective to tackle the causes of flood disasters, rather than just providing post-event relief. Working with communities to build their ability to continue to develop and thrive in the face of flood shocks resonates with the principles of insurance. Despite this increasing evidence, around 87 per cent of all funds targeted at disasters at present is aimed at post-event recovery and relief, with only 13 per cent on resilience building (as discussed in the main body of this chapter). The Zurich Flood Resilience Program demonstrates that acting pre-event is more effective than responding afterwards.

Managing flood risk is a complex multi-stakeholder task and therefore demands a multidisciplinary approach which moves beyond current thinking. To implement the programme, Zurich has formed a multi-year, cross-sector alliance that seeks to improve the public dialogue around flood resilience while demonstrating the benefits of pre-event resilience building. The programme focuses on three key strands – delivering interventions at a community level, generating knowledge to build scale and influencing public policy.

Key to the programme is the development of ‘resilience thinking’. The development of a resilience mindset goes beyond existing approaches to risk reduction and mitigation. The Zurich Alliance has focused on using their different perspectives and tools to establish an operational resilience framework to identify how to strengthen resilience to floods. This framework utilizes two existing models. The first uses what is known as the ‘4R properties of resilience’, comprising four components of resilience, which are robustness, redundancy, resourcefulness and rapidity. The second model is the Sustainable Livelihoods Approach (SLA), in particular the use of the five commonly used capitals (or assets), namely physical, social, economic, human and natural. This is termed the ‘5Cs’.

Combined, Zurich Alliance’s 4R-5C Framework aims to build resilience to shocks, which is defined as “the ability of a community to pursue its social, ecological and economic development and growth objectives, while managing its risk over time, in a mutually reinforcing way”.

In other words, if a flood-prone community has flood resilience, its development will not be disrupted due to flooding. This ability comes from the community developing certain properties (the 4R model), which in turn comes from the way in which it builds, maintains and uses its assets (the 5Cs). This means focusing on investing in those assets *before* the flood.

By evaluating the 5Cs (the sources of resilience) using a measurement tool adapted from Zurich’s Risk Assessment methodology, interventions that go further than traditional risk-reduction approaches can be identified. Through tracking these sources over time it is possible to use the measure as a pre-event proxy for resilience itself. During the period 2016–2017, the framework is being deployed in a variety of contexts, where it can clearly be validated.

Beyond the focus on pre-event risk reduction, the Zurich Flood Resilience Program is learning from past flood events to improve for the future. Evidence from various Post-Event Review Capability (PERC) studies (discussed also in Chapter 2 in Box 2.2) illustrates that there are many repetitive flood losses at the same locations. Here, the tendency is to reinstate ‘as was’ with ‘building back’ rather than ‘building forward’, therefore missing opportunities.

There is much that insurers can do to increase flood resilience after such losses during the reinstatement period at low or no cost, by promoting a ‘build back better’ approach. This suggests a challenge to traditional insurance, such as the need to think about ‘betterment’ in flood policies. In addition, current insurance models often fall short of providing incentives for insureds to invest in prevention and thus not sending enough of a signal that we all share the same interest in trying to avoid the loss before it occurs.

Apart from product developments, there is an opportunity for the insurance industry and policy-makers to combine forces to develop standards for undertaking the above proactive approach. This would not only reduce cost but also increase awareness and uptake of resilience-building activities (a recent round-table discussion between insurers, construction firms and government in the United Kingdom is pursuing this agenda following the winter storms of 2015/2016). Risk management is core

to the insurance industry, therefore, and is at the heart of resilience thinking. By working as an engaged partner, providing not just traditional project funding but also contributing skills and expertise, Zurich aims to bring this thinking to a wider audience, at a community level and also with policy-makers. ■

Promoting resilience at a household level

When faced with high levels of disaster risk, rural households tend to diversify occupations within the household instead of focusing solely on agriculture as a risk-management strategy, with negative impacts on long-term welfare (Rentschler, 2013). Such actions may reduce risk but they also obstruct growth and incentives to invest and thus undermine household resilience over the longer term (Dercon, 2005). In contrast, households are more resilient to climate extremes and disasters if they are able to save and invest, building up their assets. Social safety net programmes and financial services (such as micro-insurance), as well as local risk-management measures, can all help households to cope with disasters and some will also stimulate savings, increase investment in productive assets and enhance agricultural output, with subsequent improvements in income levels and resilience (Tanner et al., 2015).

Social safety nets

Social protection could play an important role in building resilience to disasters by helping households to smooth consumption, protect and/or build their assets and even through investment in measures that reduce risk. With such a buffer, households are less likely to take children out of school and send them to work or sell off productive assets after a disaster (de Janvry et al., 2006; ERD, 2010; Guarcello et al., 2010). Following the 2011 drought in Kenya, for example, poverty increased by 5 per cent, but participants in the Hunger Safety Net Programme (HSNP) did not fall further into poverty (Merttens et al., 2013).

Whether social protection does the job of easing consumption, or of also reducing disaster risk and helping people to adapt, depends on the type of social protection as there are many different kinds: from temporary employment programmes to sophisticated conditional transfer schemes where payments are linked to children's school attendance or health visits. The World Food Programme's Food Assistance for Assets (FAA) projects clearly aim to reduce the risk of disasters by building community infrastructure. Project participants in Lesotho and Bangladesh raise roads, lift homesteads, and build flood defence barriers in return for food vouchers or cash (WFP, 2013).

Some social protection programmes aim to promote or 'graduate' people to a level where they are strong enough to recover from shocks in the long term without external support (Sabates-Wheeler and Devereux, 2013). In contexts where

changes in weather patterns are predicted to undermine the sustainability of natural-resource-dependent livelihoods (e.g., small-scale farmers in drought-prone areas) social protection can support people in changing or diversifying their main livelihood activities – e.g., by providing support for off-farm rural enterprises, assisted migration or improved remittance schemes – rather than promote existing livelihoods (Davies et al., 2009; Béné et al., 2013). This will help them to absorb shocks, but, unless their incomes increase and/or become more stable, their ability to plan ahead and mitigate impacts will be limited.

Financial services

Commercial financial services are unaffordable for many and fail to target rural inhabitants in many developing countries. Lack of regulatory frameworks, limited commercial interest in expanding activities and poor financial literacy amongst potential users are all barriers. To fill this gap, non-traditional financial services in many countries are expanding, provided by NGOs and even local civil society organizations (Haworth et al., 2016).

Village savings and loans schemes are particularly popular. Some members use these to diversify their incomes, providing a buffer in a crisis; however, over the longer term, those who are able to invest can increase the efficiency, productivity and profitability of their economic activities and take measures to protect their assets. Micro-insurance can provide small businesses and farmers with rapid access to post-disaster funds, protecting livelihoods. These schemes can be key determining factors in enabling rapid reconstruction and economic recovery after extreme weather events (World Bank, 2012). Weather-indexed agricultural insurance provides a promising alternative to traditional agricultural insurance (where pay-outs can be unreliable as damage is difficult to ascertain).

Local-level risk management in agriculture

DRR investments in farming and fishing communities can have important benefits in terms of avoiding disaster losses and can provide other co-benefits for farmers, increasing their resilience over the longer term (Tanner et al., 2015; see the following section). A floodgate rehabilitation project in Lao PDR increased flood protection, reducing losses by US\$ 13,200 on average per gate. But the investment also resulted in farmers increasing their fish catch in the flood plain, with an average annual benefit of US\$ 3,600 per floodgate. Similarly, in Jamaica, public investments to reduce drought risk in farming, including a dedicated irrigation system, have increased productivity and output as well as reducing soil erosion and deforestation by optimizing previously inefficient farming practices (Vorhies and Wilkinson, 2016).

BOX 3.3 Cost-effective programmes that build community resilience

Cost-Benefit Analysis (CBA) is an evidence-based quantitative tool useful for informing future resource allocation and deployment by existing and potential donors and other relevant stakeholders to assess the extent of the impact of interventions. In this instance, it is specifically intended to demonstrate the financial and economic value of incorporating DRR initiatives into development planning. CBA measures the costs and benefits associated with undertaking projects and programmes. It also takes into consideration such variables as environmental costs, biodiversity preservation, disaster preparedness, informal activities (with economic value), social opportunity cost of labour, and opportunity cost of investment. One of the key indicators used in CBA is the benefit-cost ratio (BCR). This ratio is an indicator that attempts to summarize the overall value for money of a project by expressing the proportion of costs to its benefits. A BCR greater than 1 would be favourable as it realizes more benefits as compared to the costs.

During 2015, the IFRC undertook a number of food security and livelihoods-related CBA studies across National Societies. The cases include Namibia and Zambia from the Zambezi River Basin Initiative (ZRBI), Rwanda, Georgia and Tajikistan. The overall objective of the studies was to provide quantitative analysis to complement the documented qualitative benefits of the IFRC supported programmes with a view to informing future decision-making and increase of donor investment funds into development interventions. Specifically, the studies aimed at: (1) quantifying the economic value and benefits of food security and disaster preparedness interventions; (2) informing future programming interventions and allocation of resources; and (3) quantitatively demonstrating the economic viability and multiplier effect of financial investment made in a way that can inform further investment.

In Namibia, the focus of the study was on food security and disaster preparedness interventions in its selected communities of Lisikili, Katima, Kanono, Isize, Kwena and Namalubi. Through participatory community and individual interviews, the study measured the impact of activities undertaken by communities and noted a BCR of 3.7 achieved for the period 2009–2014, inferring that every dollar spent during the period saw the communities reaping US\$ 3.70 in benefits. This demonstrated a positive net impact and economic return on resources invested for the project. The study concluded that programme integration strengthens resilience capacity of communities, it is cost effective and has positive impact on DRR.

In Zambia, the partnership on livelihoods programming with the government stakeholders at a district level helped to institutionalize the programme and to ensure its quality through continuous technical support. In addition, the linkage of the livestock and crop management programme to agricultural best practices and disaster preparedness provided a holistic approach in ensuring that food security and livelihoods are sustainable and resilient to sudden events along the Zambezi River Basin. A BCR of 4.9 was achieved for the period 2010–2015, which demonstrates a positive net impact of resources invested in the ZRBI in the country.

In Rwanda, the main activities include provision of shelter, food security and livelihoods activities, especially for orphans, vulnerable families and returnees. The livestock initiative provided herds of cattle, pigs, goats, rabbits and other livestock to targeted communities. To ensure that each household in the community received livestock, a rotation programme was launched through which the firstborn livestock was passed on to another household; each animal then reproduced a newborn for another household.

The study findings revealed impressive performance for pigs and cows compared to goats. The projections based on 2014 and 2015 results showed that 1 Rwandan Franc (FRW) invested in pigs would bring back 6 FRW in 2020, a sign of a very profitable project. The CBA results for cows suggest that 1 FRW invested by the Rwanda Red Cross had returned 4 FRW after an eight-year period, and would return about 5 FRW in 2020. The goats registered a much smaller BCR of 1.8 over the same period. Other spin-off benefits noted from the programme were employment creation, improved animal husbandry practices and techniques, as well as improved food security and dietary patterns. Better institutional relations have been established also, through collaboration and information sharing.

In Georgia, its CBA found that the US\$ 2.4 million of external support to the disaster risk management programme of Georgia Red Cross Society (GRCS), launched in 2010, had paid off extremely well. The study identified that the intervention had avoided hazard losses and analysed the various channels that led to loss avoidance. There were also some significant organizational and governance co-benefits. Through assuming time horizons of 15 years, adjustment of past financial figures by inflation and discounted for years beyond 2015, cost-benefit ratios were calculated for three surveyed areas. Identified cost-benefit ratios ranged from 12.53 (Sagarejo; supported over four years) to 20.60 (Ambrolauri; supported over four years) to 54.54 (Lagodekhi; supported over one year, effective mitigation). Although the highest ratio is partially attributable to mitigation as well as excellent targeting (high level of hazard exposure), the study also shows that the promotion of household preparedness pays off.

In Tajikistan, the focus concerned geophysical and hydro-meteorological hazards. The earthquakes in recent years have had minor impact and damages. From the CBA studies, results from communities' projects in Navbunyod show positive initial investments of 4.7 times as of 2015; in Khonako, benefits exceeded investments by 2.3 times.

Overall, the CBA studies carried out by the IFRC show that DRR programmes and projects implemented by Red Cross and Red Cross National Societies can be cost effective as they save not only lives but also money and they build community resilience. ■

A stronger business case for investing in resilience

Despite the growing emphasis on resilience in international policy frameworks and the examples of investment highlighted in the preceding sections, investment is not happening at the rate needed to curb rising disaster-related losses. Although some countries, cities and communities have made progress in anticipatory actions, post-disaster response measures still dominate (Kellett et al., 2014).

There are many reasons for this underinvestment in disaster resilience. These include lack of resources, limited understanding of risks and impacts, and a bias towards funding and political visibility of post-disaster assistance (Wilkinson, 2012; World Bank, 2013). Crucially, policy-makers tend to underinvest or not invest at all in projects to manage risk because the costs of such investments are visible and immediate, whereas their benefits are dependent on a disaster event occurring. Existing methods of appraising investment decisions often fail to incentivize investing in resilience as they undervalue the resulting benefit streams.

To overcome these barriers, a new business case is emerging that moves away from a singular focus on losses as a driver for action towards the recognition and appraisal of a broader set of 'resilience dividends' (WRI, 2008; Rodin, 2014; Tanner et al., 2015). This business case builds on the understanding of ancillary or co-benefits (Global Commission on the Economy and Climate, 2015; Kok et al., 2008) and argues that investments to build resilience can be good for wealth, well-being, profit, growth and sustainable development, as well as preventing human and economic losses should a disaster strike. A more comprehensive and compelling business case and cost-benefit assessment can therefore be created when decision-making considers three areas of benefit, or the 'triple dividend of resilience' (Tanner et al., 2015), as outlined below.

Reducing damages and losses

Investing in resilience can yield a wide range of benefits, but the central rationale and common focus for disaster risk management and climate-change adaptation is associated with saving lives, reducing losses and supporting both individuals and communities to bounce back from disasters quickly and effectively. The UNISDR's *Global Assessment Report* (2015) estimated that annual global investment of US\$ 6 billion would generate total benefits from risk reduction of US\$ 360 billion; this is equivalent to an annual reduction of new and additional annual projected disaster losses of more than 20 per cent (UNISDR, 2015).

Early-warning systems are frequently cited for their role in reducing economic losses of disasters by triggering other important preventative actions, as there is more lead time to protect assets reducing damage by as much as 90 per cent (Subbiah et al., 2008). In Bangladesh, the Comprehensive Disaster Management Programme helped bring forecasting ability up from three days to five days' lead time, with an additional US\$ 800,000 invested in flood early-warning systems. A cost-benefit analysis suggested that every US\$ 1 invested in flood early warning yielded an estimated US\$ 260 return, with the net present value (NPV) of benefits at US\$ 495 million (Government of Bangladesh, 2015).

Establishing and enforcing risk-informed, locally appropriate standards and codes for new buildings and other infrastructure reduces the risk of damage to structures in the event of a disaster. Existing infrastructure can also be retrofitted to adhere to building standards. For example, Cyclone Ian in Tonga in 2014 had significantly less impact on houses constructed to cyclone standards in the early 1980s than it did on many newer houses that were not built in compliance with the standard. These were completely destroyed or severely damaged (GFDRR, 2015). Similarly, homes built with typhoon-resistant features as part of the Storm Resistant Housing for a Resilient Da Nang City project in Viet Nam showed no damage when Typhoon Nari hit in October 2013 (Tran, 2014).

BOX 3.4 A 'win-win' outcome for refugee housing in Jordan

As large numbers of Syrians fled their country and sought safety and protection in Jordan one of the obvious but less-discussed issues was the impact and consequences of the lack of available accommodation in the country both for Syrian refugees and Jordanian households. According to governmental estimates, the Jordanian housing market was facing a shortfall of at least 24,000 housing units prior to the Syria crisis. The influx of Syrian refugees has created a need for an additional 90,000 units approximately, which inflated rental prices, increased competition and decreased housing standards for all.

Jordan currently hosts around 630,000 registered refugees with the Government estimating about the same number of citizens of Syria who do not consider themselves a refugee but are unable to return home due to conflict. Some 15 per cent of registered refugees live in official camps, the rest staying with friends, relatives or, most frequently, renting accommodation in Jordanian host communities with large refugee pockets across northern Jordan and in the capital city of Amman.

The additional housing demand has not only increased the pressure on available adequate housing but is also impacting on the rental prices with a majority of refugee households reporting rent and related cost, such as housing utilities, as by far the single highest expenditure in their budgets. This is in a situation where, according to The UN Refugee Agency (UNHCR), 86 per cent of refugees live under the official Jordanian poverty level and unable to find legal income-earning opportunities and livelihoods.

Throughout 2015 we saw increasing instances of various negative coping strategies, including decreased food intake, withdrawal of children from schools or increased child labour. The ongoing search for shelter has ranked among the key sources of tension in local communities and has negatively impacted poor Jordanian families.

The lack of available, habitable shelter has meant that many Syrian refugee families share shelters with relatives or strangers and that around 20 per cent of accommodation assessed by the NGO the Norwegian Refugee Council (NRC) does not provide a basic level of weather protection.

Building on its experience within the Middle East region, NRC decided to address the complex issue through an integrated approach that addresses the immediate needs of the refugee households and strengthens the resilience of the host communities through long-term gains. NRC has been identifying Jordanian landlords who had started but were unable to complete their houses, and offered additional support to finalize their housing units. In exchange, the landlords commit to offering rent-free accommodation to Syrian refugees for a pre-agreed period of time. The amount of NRC cash grant is based on the number of offered rent-free months and average rental levels in the specific areas. This is proving to be effective because, instead of month-by-month cash for rent implemented by multiple agencies in Jordan, 12 to 24 months' worth of rent value is offered upfront for the landlord to upgrade or complete their house and accommodate vulnerable refugees identified by NRC.

This approach addresses both the issue of availability of housing units and the refugees' ability to afford adequate housing. With an average rent-free period of 18 months, the project has also offered a degree of predictability and stability to the refugee households. Prior to joining the programme, 40 per cent of the interviewed refugee households had moved at least three times within the previous 12 months, often due to eviction caused by their inability to continue paying for their housing.

After the first year of implementation, the project benefited some 13,000 Syrian refugees, while contributing significantly to expanding the housing stock in the areas of operation. As an example, about 10 per cent of all new residential construction in the Irbid governorate during that period was supported by NRC. Some 65 per cent of the refugee families reported to NRC that they were able to decrease or eliminate their debts. The instances of school dropouts and child labour decreased threefold, purchase of aid, predominantly comprising World Food Programme (WFP) food vouchers, was minimized, and many refugees were reported to have stopped selling other assets.

Strong, equitable lease agreements developed by NRC lawyers through consultations with all concerned parties also subsequently served as an important precondition to stay registered with the Government of Jordan and thus be able to benefit continuously from access to health, education and other services and assistance schemes.

By removing the Syrian refugees' largest single expenditure, the project managed to stabilize many households and addressed a variety of their other immediate humanitarian needs. In addition, the impact on the host communities has stretched beyond the landlords who were enabled to complete their unfinished housing as the cash grants disbursed to the landlords were used to procure materials and labour locally. Thousands of local residents benefited from new local income opportunities with millions of US dollars injected into local markets and economies through the project.

"Rent is like a ghost lingering around, whose presence becomes known after the 15th of every month," a Syrian refugee Asma once told us, confirming that the constant risk of eviction and growing despair about a decreasing lack of options made many families seriously consider returning to war-torn Syria. Indeed, Jordan had seen a surge of spontaneous returns to Syria in the autumn of 2015, when WFP cut its monthly assistance of US\$ 28 per person, the main source of regular legal income for most households.

The intervention has therefore managed to address the refugees' immediate needs by providing adequate accommodation and impacting on the families' expenditure patterns. It has also strengthened the resilience of the host communities by supporting them economically and helping them expand their capacity to host substantial numbers of refugees fleeing the conflict in Syria. The project has emphasized the need for broader policy changes too, which focus on comprehensive solutions such as refugee access to legal income as a precondition to cover rent and other basic household expenditures, or the need for further investment and prioritization of shelter solutions that improve access to affordable and adequate housing. ■

Reducing background risk and the development dividend

While losses have tended to be the focus of business cases for investing in resilience, the risk of disasters creates ‘background risk’ also, which constrains investment in capital productivity, forward-looking planning, long-term capital investments and entrepreneurship for fear of disaster events eroding returns (Hallegatte et al., 2016). When levels of background risk are high, households lacking effective risk-management tools will tend to engage in a wider range of lower-risk activities rather than specializing. Such diversification can spread risk, but it also often reduces returns to assets and investments. Although these types of action reduce the risk of severe losses, they can prevent pathways to greater prosperity and incentives to invest as well (Carter and Barrett, 2006; Dercon, 2005).

Household insurance and social safety net programmes have been seen to stimulate savings, increase investment in productive assets and improve agricultural output in a number of different countries, with subsequent improvements in income levels. In Ethiopia, the R4 Rural Resilience Initiative is providing weather-indexed insurance that is enabling small-scale farmers to increase their savings, which can act as an important reserve in the case of contingencies. In addition, insured farmers have increased their investments in productive assets such as oxen, fertilizer, improved seeds and compost, thus improving their overall productivity (Greatrex et al., 2015; Madajewicz et al., 2013).

Hard infrastructure for protection and soft DRR measures such as monitoring and early warning can protect assets from disaster impacts. In addition, they are likely to raise land prices, demonstrating an increased willingness for people to invest in these areas given the reduced background risk. These increased land values can consequently raise government revenue, helping finance the cost of pre-disaster risk-management measures.

The developmental cost of disasters is also present in fiscal management. Including disaster risk in shock financing mechanisms can reduce uncertainty, while implementing a structured process for risk detection in the fiscal balance sheet can potentially provide a ‘price signal’ that incentivizes greater resilience through awareness of and management of risks (Phaup and Kirschner, 2010; Griffith-Jones and Tanner, 2016). The benefits of lower background risk may be reflected in businesses and governments’ access to affordable credit as well, with credit agencies already warning that, to a larger degree in the future, credit profiles may be determined by climate-related disasters and the increased risk of exposure for companies and their global supply chains (Standard & Poor’s Rating Services, 2015).



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Co-benefits of resilience investments

Most disaster risk-management investments serve multiple purposes, and are not solely designed to reduce disaster impacts and offer co-benefits that are related to levels of risk. Strengthened river embankments can act as pedestrian walkways, parks or roads; strengthened disaster early-warning systems also often improve weather-forecasting capacity, which can be used by farmers to know when to plant and harvest; or disaster shelters can be used as schools or community spaces, when not being used as shelters. These multiple uses of DRR infrastructure form cost-saving co-benefits that materialize even in the absence of a disaster, strengthening the immediate business case for investing in DRR.

Such co-benefits are well illustrated by an IFRC mangrove plantation and DRR project in the typhoon and flood-prone coastal provinces of northern Viet Nam (IFRC, 2012). The benefits of this multi-purpose disaster risk-management project include: carbon sequestration, nutrient retention, sediment retention, biodiversity habitat, flood attenuation, wastewater treatment, and water supply and recharge. The 17-year-long project has involved the creation of 9,462 hectares (23,381 acres) of forest (8,961 hectares [22,143 acres] of mangroves) in 166 communes and the protection of approximately 100 kilometres (62 miles) of dyke lines. There has been an increase in per-hectare yield of aquaculture products such as shells and oysters by 209–789 per cent. Economic benefits from aqua-product collection and honeybee farming are found to equate to between US\$ 344,000 and US\$ 6.7 million in the selected communes. Global environmental benefits include US\$ 218 million alone, generated as an estimated minimum of carbon dioxide (CO₂) emissions absorbed by the planted mangroves (assuming a price of US\$ 20 per tonne CO₂ equivalent [CO₂e]).

Building resilience from below: inclusion and accountability

Investing in resilience is not only about committing financial resources; mechanisms for ensuring accountability are also needed if these investments are to meet the needs of vulnerable communities. Accountability is the capacity of relevant actors to take responsibility for their actions or commitments, as well as the ability of others to hold them to account (Newell and Bellour, 2002). The accountability of government and other investors in resilience to vulnerable communities can be enhanced through a number of mechanisms including parliamentary oversight, participatory budgetary processes and risk assessments, and through the media and communications activities (including use of big data). All these have the potential to increase transparency in how resources are allocated and distributed, and help improve the chances that investments meet their objectives. Some of these mechanisms are explored below.

Participatory risk assessments

Vulnerability and Capacity Assessments (VCAs) are the foundation of resilience investments. They are important, both as products and processes. They can provide valuable inputs to decisions that need to be taken about where to invest or what to insure; and they can also increase transparency and be used as a consensus-building tool (Renn, 2008; Wilkinson and Brenes, 2014). However, most risk assessments are conducted as stand-alone projects by donors and aid agencies and do not lead to long-term ownership or everyday use of the tools and methodologies (Wilkinson and Brenes, 2014).

Participatory risk assessments are more useful for household and public investment decisions. If carried out properly, risk assessments and VCAs can raise awareness and increase knowledge and understanding of the risks people face and their ability to deal with them. Assessments depend on the involvement of a wide range of stakeholders to: provide and analyse data, validate data (through local expert knowledge and perspectives) and ensure ownership of findings, stimulate a shared understanding of an issue and appropriate solutions, as well as the potential to influence policy and practice elsewhere (Twigg, 2015, 5).

BOX 3.5 Women fighting in the front lines of climate change and disaster risk in Viet Nam

In Viet Nam, where they make up more than half of the population, women play key roles in climate change and disaster risk management within their households, community and society. However, existing gender inequalities limit women's full participation and leadership in decision-making on climate-change adaptation and disaster risk-management activities. Women still tend to be regarded as affected persons and not as active agents in the fight to reduce climate change and disaster risk.

The geographic location and landscape of Viet Nam make it vulnerable to a wide variety of hazards, ranging from heavy rainfall, floods, landslides, typhoons, hot days and heat waves, droughts to cold spells. According to the *Viet Nam Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (2015), climate change has increased the erratic nature of weather-related hazards and has brought about an increase in other slow-onset disasters such as saltwater intrusion in the coastal areas, particularly in the Mekong Delta. Disasters account for about 400 deaths annually and economic losses amounting to 1.0–1.5 per cent of GDP. It is predicted that extreme events will have greater impacts on sectors with closer links to climate, such as water, agriculture and food security, forestry, health and tourism.

It is believed that women are at high risk from climate change and disasters in Viet Nam. Although recent disaster trends show that more men are likely to be killed in disasters than women, this is largely due to the gendered roles which focus on the protection of women while putting men in high-risk situations during disasters. However, long-term impacts of disasters and prolonged emergencies affect more women than men. As seen in the recent drought and saltwater intrusion caused by the

El Niño in the south of Viet Nam, limited access to water, sanitation and food had greater implications on women's health and livelihood compared to men's (Joint Assessment Team, 2016). Women were found to be spending longer hours and at more frequent intervals in collecting water for their families, which prevented them from taking part in an already limited number of livelihood opportunities.

The implications on food availability meant that women were prioritizing meals for their family members and eating less themselves as a result. Similar conditions are found in the aftermath of other disasters such as floods where women are mainly responsible for cleaning up their homes, agricultural lands and taking care of their family's immediate needs. Collection of data on sex, age and disability and further gender analysis is required to better understand and take into account the gendered impacts of climate change and disasters for better informed planning.

Ensuring women's participation in planning and implementation is key to effective disaster risk management. Although the *National Strategy on Natural Disaster Prevention, Response and Mitigation to 2020* mentions the protection of women; and the *Law on Natural Disaster Prevention and Control 2013* mentions gender equality (among other issues) in its guiding principles, they both fail to mention women's roles clearly in regard to disaster management. A positive shift in the perception of the role of women was seen in the adoption of a Government Decision in 2013, under the disaster management law, which directed the official inclusion of the mass organization Women's Union in the Committees for Natural Disaster Prevention and Control at the central level and all subsequent levels down to the commune level (lowest administrative level). Also, in 2009, the national programme on Community Based Disaster Risk Management directed local governments to maintain at least 30 per cent women in assessment and planning activities. This meant that women were finally brought to the same table as men where previously they were not included.

While the Government Decision was adopted in 2013, the membership and participation of the Women's Union in Committees for Natural Disaster Prevention and Control varies from province to province in reality. In most locations, the Women's Union, like other mass organizations such as the Farmer's Union and Youth Union, are found to be involved in carrying out post-disaster activities such as relief distribution and recovery. Women lack the necessary skills and confidence to participate and take on leadership roles in disaster risk management (assessments, planning and implementation) in meaningful ways.

With these challenges ahead, UN Women works in partnership with the Women's Union, and in coordination with other agencies such as UN Development Programme (UNDP) and organizations like Oxfam, in building the capacity of its leaders and members on gender mainstreaming in climate change and disaster risk management. The Women's Union's network reaches out to more than 15 million women at the grass-roots level in every province in Viet Nam, making the Women's Union best placed to raise women's priorities and concerns in climate change and disaster risk management. Through its networks, the Women's Union also raises awareness on women's roles in disaster risk management in the community with the objective of changing the social norms. Life-skills training, such as swimming classes and first aid for women and girls, has resulted in more women being included in response teams at the community level unlike ever before.

In addition, UN Women is supporting the capacity development of disaster management authorities, such as the Disaster Management Centre under the Directorate of Water Resources and the Ministry of Agriculture and Rural Development, which are responsible for implementation of the national programme on CBDRM. UN Women has conducted trainings on gender equality in DRR for government staff and trainers working on CBDRM. UN Women is also helping the Disaster Management Centre in the development of guidelines on gender mainstreaming in CBDRM at the community level, with the objective of supporting local government staff to move beyond the simple counting of numbers to ensure gender issues are given priority.

As governments, including Viet Nam's, prepare to implement the Sendai Framework, it is essential that gender equality and women's empowerment principles are translated into targets and actions at the local, regional and national levels. There is a need for concrete investments in the role of women in reducing the risks of climate change and disasters effectively. ■

Inclusive early-warning systems

Early-Warning Systems (EWSs) have proven to be extremely effective investments in reducing loss of life. In Bangladesh, the actual number of deaths from tropical storms has fallen significantly since an EWS was put in place, alongside evacuation training and the construction of cyclone shelters. As cyclones have affected different areas and numbers of people, a better way of calculating the effectiveness of preparedness policies is to look at numbers of deaths relative to houses 'destroyed' by the wind and surge. Over a 40-year period there has been a 100-fold reduction in fatalities related to housing that was destroyed by cyclones, which suggests that the EWS and evacuation policies have been successful (Haque et al., 2011).

EWSs need to be well integrated, from risk detection to dissemination of warnings and facilitation of emergency preparedness measures (IFRC, 2012). However, research has detected many communication gaps in their use, reducing their effectiveness (Baudoin et al., 2016). In 2008, the Ayeyarwady Delta region of Myanmar was battered by Tropical Cyclone Nargis. The Department of Meteorology and Hydrology (DMH) was tracking the cyclone and issued timely warnings but delta residents, who have access to only one radio channel, lost the signal when the electricity services ceased (Wilkinson et al., 2015). On the eve of the cyclone making landfall when the last warning was issued on national radio, few residents heard the warning. Nine years later, in 2015, these circumstances were repeated when the DMH provided an early flood warning that did not reach everyone. The Government admitted its response was limited and that there was confusion over evacuation procedures (BBC, 2015).

Community participation in EWSs can overcome some of these gaps (Basher, 2006; Mercer et al., 2009). Communities have knowledge of the risks, and communication of these through existing social networks and channels will be more effective than creating new external ones. In Sri Lanka, for example, a community-based EWS for landslides in the Matale district has been very successful – communities moved out of landslide-prone areas on the basis of information from rain gauges that they were monitoring (Baudoin et al., 2016).

Transparency in resource allocation

Increasing volumes of adaptation finance are being spent on resilience projects in lower-income countries, but there is little clarity as to how these funds are being used at the local level (Terpstra et al., 2013; Wilkinson et al., 2014). Local governments in many countries lack the capacity to manage and distribute these funds effectively. Mechanisms for monitoring climate-related funds and ensuring that they are being used for investments that target the most vulnerable are critical and include public consultation processes, freedom of information initiatives, formal project evaluations and the use of parliamentary oversight functions.

Civil society involvement in oversight of both domestic and international finance is important, particularly at the regional level where significant investments in disaster risk-management and climate-change adaptation are being made. Under the Adaptation Finance Accountability Initiative, for example, NGOs in Nepal, the Philippines, Uganda and Zambia tracked the delivery of international adaptation finance down to the local level through national budgets, as well as by the amount of funds being directly received by local institutions. This highlighted gaps in awareness (little local knowledge of what kinds of projects were being funded); poor targeting of funds to adaptation needs; low levels of transparency (lack of data on disbursement or objective of funding, making it difficult to track it); and lack of coordination between funders and implementers, resulting in overlaps and duplications (Wilkinson et al., 2014).

In the Philippines, political accountability for the use of international and domestic funds has been increased through pressure from the Institute for Climate and Sustainable Cities. This led to the setting up of an Oversight Committee for Climate Change (OCCC) for the House of Representatives in 2014 to exercise oversight of government agencies responsible for channelling adaptation finance down to the local level. This is an important step in ensuring investments target the most vulnerable (Terpstra et al., 2015).

Conclusion

In order to safeguard and promote improvements in human well-being and planetary security, investing in resilience must become a priority around the world. There is evidence of increased investment flows in DRR and climate-change adaptation across a range of scales, backed by a supportive set of international policy frameworks, but the rising losses from disasters suggest that much more needs to be done globally. Addressing barriers to investment are critical, including ensuring that investment decisions can be taken in the face of uncertainty surrounding future climate-related and other risks.

These investments will be made more attractive by taking into account the full range of benefits provided by anticipatory risk-management actions. At the same time, such investments must protect the needs and rights of the poorest and most vulnerable people of the world, including through bottom-up processes of accountability and inclusion to enable investments in building resilience to be effective. Blended sources of finance are required that strike a balance between accountability and the need to use domestic finance where possible. Adaptive social protection is a useful example of this, and can be applied in other areas of development.

Chapter 3 was written by Thomas Tanner, Research Associate, Risk and Resilience Programme, Overseas Development Institute (ODI), and Emily Wilkinson, Head of Risk and Resilience Programme, ODI, London, UK, with assistance from Pandora Batra. Box 3.1 was written by Ben Ramalingam, Leader, Digital and Technology Cluster, Institute of Development Studies, Brighton, UK; Box 3.2 by David Nash, Z Zurich Foundation Manager, Zurich, Switzerland; Box 3.3 by Hilary Tarisai Dhliwayo-Motsiri, Senior Officer Livelihoods, Food Security File, Community Preparedness and Risk Reduction Department, IFRC, Geneva, Switzerland; Box 3.4 by Petr Kostohryz, Country Director, Norwegian Refugee Council (NRC), Amman, Jordan; and Box 3.5 by Sumaiya S Kabir, Planning, Monitoring and Reporting Officer, UN Women, Hanoi, Viet Nam.

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Anticipation: getting better at getting ready

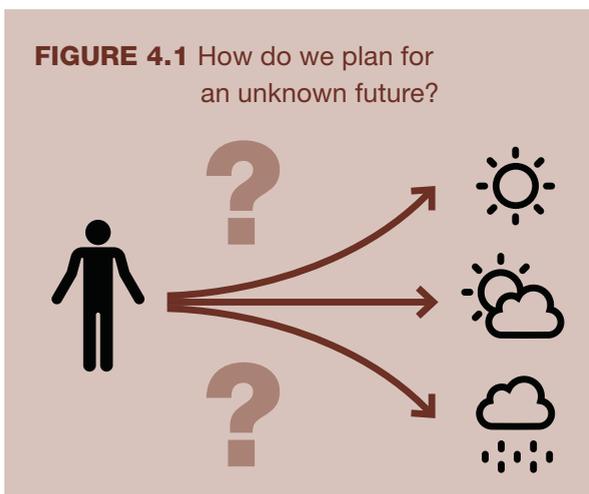
*“Choosing among risks
We need imagination
Of lives yet un-lived”*

Brian Zikmund-Fisher

For many years, scientific enquiry into societal problems such as disaster risk and climate change has centred around ‘what if...’ questions: what if the flood happens? What if the drought continues? What if there is no economic upturn? What if we have done too much damage to the environment already? These types of questions guide our ability as rational beings to plot possible alternative outcomes to the problems we face.

However, there is a fundamental flaw in only asking ‘what if’ questions if we assume that the future is based on what has happened in the past. The past is not necessarily the blueprint for the future, and this assumption can lead to bad planning. For example, government contingency plans may be based on one scenario with a known end game, such as wildfires in the dry season that require response. There is, however, a risk to presume that past experiences will inform future actions sufficiently enough to be adequate (therefore: ‘What is the worst fire we ever experienced, and let’s plan for the recurrence of such an event’). But the impact of climate change through, for instance, stronger or weaker El Niño and La Niña periods is not readily translated into such contingency planning, because future climate events are likely to be less predictable than those of the past. Massive disasters of this type highlight the need to reconsider how we foresee future events. Such anticipation enhances the ability to take action and return to a new normalcy.

Resilience is often viewed as an outcome that produces an equal state between nature and society, within a continuous process of adaptation (Zhou et al., 2010). For instance, according to UNISDR’s definition (2009), resilience is understood as “the ability of a system, community or society exposed to hazards to resist,



Volunteers from the Timor-Leste Red Cross Society's Dili branch visit a home as part of an education programme to prevent dengue fever. Richardo Bento (from left), Lorenzo Lurdes, Clementa Bento and Floriana Carolina Pieres discuss ways to prevent dengue from spreading around their home.
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absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”. This concept may lead to a linear view of the quantification and explanation of resilience, based on the understanding that both socio-ecological linkages and social contexts in which resilience is created, maintained and sustained are needed not only to recover, preserve and restore but also to improve or transform the previous situation, taking advantage of the opportunities.

Writing on wildfire hazards in South Africa, Van Niekerk (2014) considered how socio-ecologically linked systems can engage in adaptive governance in the face of such hazards. In his research on recurring wildfires in the North-West Province of South Africa he found that collective experience, learning, engagement, information sharing, capacity development and communication were key factors that enabled actors to better anticipate their future resource needs. Importantly, this approach did not attempt to build on models based only on an analysis of previous wildfire seasons. In this case the actors (as part of a complex system) did not plan for a ‘worst-case scenario’ but a ‘no-case scenario’. Therefore, the point of departure was to have no significant wildfires in the subsequent fire seasons based on a new model serving the overall aim of preventing wildfires altogether. Tschirley et al. (2004) found similar evidence that anticipatory governance could greatly have mitigated the 2002 and 2003 droughts in southern Africa.

All complex systems have the ability to change to a new state (Byrne, 2002) and do so rapidly (Poli, 2014). For example, communities recover after disasters; climate change makes (at least some, if not all) people rethink and change their consumer habits; illegitimate governments are replaced. However, all interactions in complex systems do not necessarily lead to the enhancement of that system. If that were the case, everything we do would continuously contribute to making the system better – and more resilient.

For such complex adaptive systems to become more resilient the question may not only be ‘what if’ but, even more importantly, to ask ‘when’ (Fisher, 2016). Asking ‘when’ requires deeper thought about the consequences of our ‘what if’ actions. Therefore, we need to understand ‘when’ certain scenarios will play out, as well as what we will do if they are realized. The ‘when’ question requires the complex adaptive system to anticipate, rather than predict, future events. However, conventional development and disaster preparedness thinking often limits people’s ability to ask anticipatory ‘when’ questions. Rothauge (1999) uses the example of how transitions in drought management practices in Namibia weakened the ability of farmers to ask the ‘when’ question. Modernization and changes to cultural practices altered the long-term mindset that farmers had to manage droughts to short-term decisions based mainly on economic gains. This had, and may still have, a significant impact on sustainability and their ability to anticipate and cope with future drought events.

BOX 4.1 Getting ready at community level

Community resilience relies on three essential characteristics: the ability to anticipate and learn from threats; the ability to take action to mitigate and withstand the adverse effects of threats, collectively and as individuals; and the ability to return to a new normalcy, improved by lessons learnt from the adverse experience (IFRC, 2011). Community resilience requires basic infrastructure and systems to be in place, such as functioning markets, protected ecosystems and good governance; social support systems, community cohesion and a culture of inclusiveness and trust; and connectedness at multiple levels with diverse stakeholders and networks. Communities can often cope with gaps in some of these systems, but improved states of resilience better protect people and communities against a range of threats.

Ability to anticipate

Resilient communities are forward thinking, which requires an ability to assimilate risk-related knowledge and information on risk, hazards and everyday stressors, and to use this for risk-informed decision-making across all segments of the community, spanning preparedness, response and recovery.

As the Sendai Framework highlights, understanding risks and anticipating future disasters are catalysts to strengthening resilience. In many low- and middle-income countries, risk literacy, disaster awareness, and the availability of data and accessible information remain low. In light of these deficiencies, recent developments in social media, crowdsourcing and other types of digital knowledge sharing provide unprecedented opportunities for communities and humanitarians to sustain and strengthen these connections. Digital platforms can provide communities with tools to generate their own data and information, share it openly, and use it for collective action.

A good example is the Missing Maps initiative (undated), which aims literally to put the world's most at-risk populations on the map. The initiative, supported by the American Red Cross and British Red Cross, generates baseline data *before* major disasters and crises occur. Accurate maps help individuals to understand their surroundings, plan evacuation routes, and facilitate broader-scale processes such as urban planning and disaster response. In crisis situations, basemaps and geospatial data act as key tools for first responders and humanitarian agencies to visualize damage assessments; assess infrastructure, hazards and demographics; plan local and larger-scale emergency response activities; and share information among relevant actors.

Ability to take action

A community's ability to take action is inherently linked to its ability to anticipate threats and its degree of internal and external connectedness. Resilience is everybody's business, and addressing risks effectively requires both individual and collective action. Connectedness is inherently valuable to resilience. It helps to leverage the linkages between diverse and multiple systems and networks in the face of disaster. Rather than relying on the strength of individual components, resilient systems are flexible and can compensate for loss of some of its functions (ISET-International, 2014). Strongly connected communities are often able to self-organize and spring into action in order to cope with everyday risks and respond to adversities. Connected communities can also create multiplier effects through their networks (local governance structures, civil society, business community, professional and voluntary associations), creating impact at a bigger scale.

Community networks however are not always well represented in national and municipal governance structures, where critical decisions are made. This is often the case in urban settings. To improve community resilience, inclusive and participatory decision-making and action planning can drive progress in addressing specific capacity gaps and vulnerabilities.

A good example of strengthening community connectedness is Forecast-based Financing (FbF), an approach developed by the Red Cross Red Crescent Climate Centre (undated) to assist in mainstreaming 'early warning early action'. This approach recognizes that although extreme weather events are often forecasted, action sometimes does not take place because of limited resources, inherent uncertainties and the risk of acting in vain. In Tanzania's capital city, Dar es Salaam, a coalition of partners is working together to integrate an FbF process into municipal planning processes. This coalition comprises The World Bank, the Commission of Science and Technology, Tanzania Meteorological Agency, local municipalities, Ardhi University, the University of Dar es Salaam, the Tanzania Red Cross Society, the Climate Centre, the Danish Red Cross, the American Red Cross and 10 ward-level coalitions of local community groups. This coalition of diverse partners has mapped Dar es Salaam and is working to identify the most appropriate actions to take when extreme rainfall events are forecasted, to reduce the impact of potential floods.

Ability to return to a new normalcy

Disasters can damage communities' natural and physical environments, housing, infrastructure and sources of income and have a negative impact on people's health and well-being. The extent to which families can recover from a disaster depends on the situation beforehand and how robust or resilient their resources are to be able to withstand the effects of the disaster (World Bank, 2015).

In the conventional sense of the term 'resilience', the end point of community resilience is to return to normalcy as it existed before the disaster struck. However, resilient communities should not only be able to return to their previous state but also be able to retain normalcy as much as possible during the crisis *and* rebuild their physical environment and social, political and economic structures in a way that is safer, more sustainable and more resourceful than before.

Following the 2004 Indian Ocean tsunami, the Indonesian Government not only invested in building physical and economic resilience but, more fundamentally, it also invested in changing political relationships that were at the foundation of socio-economic vulnerability in the Aceh province (Fan, 2013). The Aceh Peace Agreement (2005) ended the long-lasting conflict which contributed greatly in progressing recovery and rebuilding efforts (Worldwatch Institute, 2013). The ability to cope with disasters and adversities through learning from experience and applying this learning to the anticipation and rebuilding processes is one of the most important building blocks of resilient communities. ■

What is anticipation?

Anticipation involves acting for the future in the present. Rosen (2012) defines an anticipatory system as “a predictive model of itself and/or its environment, which allows it to change state at an instant in accord with the model’s predictions pertaining to a later instant”.

This means that certain requirements need to be present for a complex system to be used for anticipating future changes. The first requirement is that the system (e.g., an at-risk community) must be able to envision alternative futures in order to change such a future. The envisioning of alternatives is rooted in the knowledge present in the system about a possible future state of that system. For instance, it is fairly easy for a community to imagine a future state in which everyone has access to housing and good health care. It is less likely that the same community could accurately envisage themselves, at some point in the future, colonizing and settling on a new planet, say Mars, or it would have been quite difficult even 10 years ago to anticipate the existence of smartphones and their current uses beyond the conventional telephone. In this example the complex system might not have the necessary information, experience, feedback loops and knowledge to be able to anticipate such a future accurately.

The second requirement is that key to anticipation is the existence of an ideal or preferred model of the system in question. It may be necessary to develop capacities to envision such plausible future(s) or desired new reality and/or realities.

The third requirement is that such a model should be predictive in nature. In this way, the components in the system must be able to determine accurately each other’s behaviours in the future state. In the example of our at-risk community, if ‘good’ development choices ensure safe housing and reliable health care, then the community should be able to change their behaviour accordingly. For instance, if the mentioned ‘good’ development takes place, will the community still reside in makeshift housing even though a better alternative is given, and will they disregard modern health care?

Lastly, the system must be able to change, and do so rapidly. If the system (community) can predict changes in the system (behaviour), and change in its well-being accordingly to reach the ideal future state, then that system can be labelled an anticipatory system (Mitchell, 2013).

An anticipatory system follows ‘cues’ and looks for similarities of the known (e.g., our community might envision brick-and-mortar houses instead of igloos). Without such prior knowledge – such as the physical environment of Mars – anticipation becomes less likely. If the system is confronted with a foreign set of components, their interaction leads to a breakdown of anticipation. Therefore,

knowledge of the constraints of the components working together influences how the anticipated outcomes will be perceived. Also, experiences rooted in the system will lead to the identification of other possibilities or alternatives. From the definition above, one can thus argue, too, that the reaction time of the adaptive system of the 'known' is better than for the 'unknown'.

This is true especially in the case where communities have historical knowledge of, for instance, disasters of a specific kind. These communities are more likely to anticipate their reaction to known hazardous events, than to unknown ones. In Malawi, a project, *Climate-Smart Agriculture: Capturing the Synergies Between Mitigation, Adaptation and Food Security* implemented under the Economics and Policy Innovations for Climate-Smart Agriculture (EPIC) Programme, aimed to guide various sectors of government through a scenario-planning process. The activities of the process involved a reflection on the historical time line of Malawi's development (establishing a predictive model), identifying key drivers for its future development (determining interaction among components and how they influence each other), and developing a number of alternative future states of agriculture. Of the four alternative future states envisioned for Malawi, it became clear that the scenarios based on known elements were much more detailed and elaborate than those based on 'unknowns'. However, the scenarios based on the 'unknowns' were the positive futures needed for Malawi's food security as perceived and expected by participant actors.

In a way, even the positive futures that Malawi contemplates are based on 'unknowns'; they are defining potential and plausible paths for innovative actions (to be designed) to take place. This is not necessarily to follow a tendency and is different than a forecast. It is about more than just taking advantage of opportunities; it is also a basis for creating a new path, with the potential of transformative and radical changes in itself.

In practice, the enquiry into the unknowns and definition of potential paths may take the shape of early warning and early action. How these actions take shape, and conditions that enable them, are illustrated in Box 4.2 with an example from Somalia.

BOX 4.2 'No Regrets Response': how early action and flexible funding is addressing vulnerability in Somalia

Disasters triggered by natural hazards in a fragile context such as Somalia have become cyclical events. However, the damage caused by these shocks, the enormous cost of humanitarian response and the considerable time taken for people to recover can be reduced with 'No Regrets Response': well-targeted early-warning information and resilience plans with flexible funding available *before* the crisis strikes. For two NGO resilience consortia operating in Somalia, the Somalia Resilience Programme (SomReP) and the Building Resilient Communities in Somalia (BRCiS), No Regrets Responses were successfully implemented during the recent 2015 El Niño season when early-warning indicators pointed to large-scale flooding across parts of southern Somalia. SomReP was started in 2013 with an approach that helps in building resilience among communities who are challenged by recurrent droughts and the chronic vulnerability that results among farmers, agriculturists, and households situated across the outskirts of Somalia. The programme builds on collective lessons learnt by consortium members: World Vision, Oxfam, Danish Refugee Council (DRC), Cooperazione Internazionale (COOPI), CARE, Adventist Development and Relief Agency (ADRA) and Action Against Hunger (ACF). BRCiS started working in 2013 with 99 communities in the southern and central regions of Somalia and, in 2015, this was extended to 41 new communities. BRCiS is a humanitarian consortium that takes a holistic approach to supporting Somali communities in developing their capacity to resist and absorb minor shocks without undermining their ability to move out of poverty. The model uses a context-based, community-led, integrated programming approach.

According to a Food Security and Nutrition Working Group (FSNWG, 2013) report on No Regrets Response, "The notion of *no regrets* in part came from climate scientists and their work with probabilities to predict future events... They use probabilities to argue that there is a point after which it is better to act than not. Statistically, a prediction may be wrong but, in the long run, early warning usually gets it right more times than not."

For No Regrets Response to be successful in Somalia, three factors needed to happen:

1. Early-warning information: accurate and context-relevant, early-warning information made available to communities
2. Early action: resilience actors and communities desire and enact their capacity to action early-warning information to preserve lives and livelihoods rather than waiting for them to be lost
3. Flexible funding: the willingness of humanitarian donors to invest in early action based on predictive evidence, reprogramme existing funding, and/or provide crisis modifier funding mechanisms.

Learning from SomReP and BRCiS revealed that community-led early actions based on early-warning information saved flood-vulnerable communities from crop losses and were more cost effective than a humanitarian response after the floods occurred. The two examples below demonstrate No Regrets Response in action.

SomReP used a vulnerability analysis from the Somalia Water and Land Information Management project (SWALIM) to predict flood-prone locations along two river networks, the Shebelle and Jubba, providing a framework for targeting detailed assessments within the riverine communities. In addition, through the support of early-warning information disseminated by radio and SMS, communities were well informed and ready to respond to pending floods. With the information from SWALIM, communities verified the historical extent of flood damage and what traditional mechanisms had been used to cope with floods in the past. Communities were able to plan how to mitigate flood risk and also contingency and recovery resourcing. Early actions were then undertaken by the communities to erect flood barriers, relocate livelihood assets and delay crop cultivation.

The result of the investment in these preparedness activities by humanitarian donors was up to four times less than a humanitarian response that could have occurred with the predicted flood. Research by SomReP indicated that for every United States dollar (US\$) spent on early warning and early action, at least US\$ 4 is saved on humanitarian interventions to the predicted flood levels. Findings concluded that community-based early-warning early action is far more cost effective than waiting for a crisis to unfold and having to deal with far greater consequences and costs of a humanitarian response that would follow large-scale flooding.

Using the same SWALIM predictions, as well as feedback from the communities, the BRCiS consortium designed a low-cost and high-portability No Regrets Response to enhance community preparedness. The response was implemented mainly in Hiran and Lower Shebelle, as well as in Kismayo. The long-term resilience programme provided the basis of a trust relationship needed for this preparedness response, which required the communities to engage and manage their own preparedness activities, and the funding was provided by the flexibility embedded in the programme's budget and completed by the UK Department for International Development's (DFID) crisis modifier, the Internal Risk Facility (IRF). This annual fund for Somalia allows for DFID's implementing partners to be able to moderate the impact of shocks, whether by anticipating or responding early to crisis via their activities.

The village committees worked in collaboration with the NGOs to pre-position supplies such as sandbags and chlorination items in local hubs. Distributions were based on the needs assessed by the communities, as well as on evidence provided by SWALIM and organized through various logistics systems based on the level of accessibility and the security situation of the villages. This self-reliant system enabled extending the preparedness response to hard-to-reach areas and where no direct access was possible. The communities then proceeded to make the embankment repairs and distribute the items themselves.

An evaluation of impact that was conducted in four districts of Lower Shebelle by Concern Worldwide, a member of the BRCiS consortium, concluded that 4,779 households were spared displacement and destruction of assets, while 12,111 hectares (almost 30,000 acres) of farmland were spared a lost crop.

What are the lessons learnt from Somalia? Resilience actors are strategically positioned to design low-cost, community-based crises mitigation and preparedness measures in the medium to longer term. For humanitarian donors in high-vulnerability contexts such as Somalia, it is possible to reduce humanitarian costs by pre-allocating crisis modifiers and flexible funds that allow for anticipating shocks and empowering communities to manage risks for a long-term impact. ■

Adaptation and anticipation

While adaptation is largely about responses to climate change, anticipation is about intentionality, action, agency, imagination, possibility and choice. It is also about being doubtful, unsure, uncertain, fearful and apprehensive. Anticipation helps orient human action and emphasizes that people make the future (at least the immediate one), whereas adaptation helps influence or constrain human action. Anticipation is predictive or proactive; it can take plausible future events and the hope of achieving certain goals and ambitions into consideration (Nuttall, 2010). Anticipation can help communities become resilient to shocks and stresses, and can identify and exploit different opportunities that may be on offer.

Anticipation therefore does hold great value for climate-change adaptation and disaster risk reduction. A large number of disasters triggered by natural hazards are associated with hydro-meteorological phenomena such as droughts, floods, cyclones, hurricanes, high/low temperatures, wind storms and sea-level rises, among others. Work carried out by the Intergovernmental Panel on Climate Change (IPCC) in recent years points to the fact that dealing with climate change will involve anticipating impacts of past as well as future human actions. The Climate-Smart Disaster Risk Management approach, developed by the UK Institute of Development Studies (IDS) and partners, used an alternative pathway model for making developmental and risk reduction decisions based on anticipated impacts as well as local priorities (Mitchell et al., 2010). Going a step further, work on climate-compatible development by the Climate and Development Knowledge Network (CDKN) has looked into local approaches to harmonizing climate-change adaptation and disaster risk reduction from practice to policy levels. The combination of long-term weather forecasts from meteorological authorities, combined with short-term understanding at the micro level through community weather stations and climate schools, demonstrates the range of anticipatory services required and the local action as well as policy lessons that can be based on these (Sharma et al., 2014).

Building community capacity

Communities are acknowledged and recognized as key actors in risk reduction as well as in transformative strategies for successful implementation, in both decision-making and project implementation (Miranda Sara et al., 2015). This recognition is already present in global thinking within the Sendai Framework. Governments thus need to invest in infrastructure, as well as in building community-based proactive resilience capacities, such as thorough training in multiple-risk awareness and anticipation. This in turn can be used to facilitate the organization, coordination, consensus building and *concertación* between multiple actors to overcome

denial, evasion, and risk tolerance – which drive inaction – to protect homes, workplaces and lives, in order to reduce losses, damages and destruction. (*Concertación*, a Spanish word, has no proper translation into English. In this chapter it is understood as a process of reaching agreements for joint action through dialogue and deliberation between multiple actors.)

Reducing risk and vulnerability is not a matter just for specialists (Cortez et al., 1998); it also requires the institutionalized participation of local communities, namely citizens and civil society organizations (CSOs). Their participation should be sought to mobilize resources, stimulate knowledge contribution, and claim rights. Participation is not a favour given to people; it is primarily a right.

It is also a challenge to understand and comprehend the wide diversity of risk perceptions and risk tolerance that leads to different risk reduction, resilience and adaptation strategies. A variety of social, economic and environmental processes plays a role in the generation of knowledge on vulnerabilities and risks. These different ways of knowing are integrated as a result of social learning processes that involve acting and reflecting on past experiences. To generate the enabling conditions for proactive resilience strategy design, innovative methodologies (such as scenario planning and community-driven action planning, discussed below) are necessary to combine these different ways of knowing and their related outcomes with concrete preventative measures. In this regard, it is also necessary to examine how certain actors behave and why they react and take action – or not. In addition, it means understanding how varieties of knowledge are used, or not, in decision-making within local and national socio-political contexts.

At the local level, where community resilience needs to be the focus, Bangkok has demonstrated the viability of area-based approaches and the role that can be played by neighbourhoods within this. Box 4.3 below describes how this played out in the 2011 Bangkok flood.

BOX 4.3 'Pre-positioning trust': an area-based approach to the 2011 Bangkok flood

Five tropical storms struck Thailand between July and October 2011, causing some of the worst flooding the country has seen, resulting in almost 800 deaths and US\$ 46.5 billion in damage and losses, according to The World Bank (Aon Benfield, 2012).

Thailand's National Housing Authority estimates 73 per cent of Bangkok's low-income population was affected due to a large number of squats and settlements built alongside Bangkok's large network of canals (UNESCAP, 2014). The Bang Bua Canal, a three-kilometre (1.8-mile) stretch of water hosting some 17,000 people, was one such affected area.

The most vulnerable people in the Bang Bua Canal were those who were less able to protect themselves from the flooding because they lived in single-storey homes or generally required more protection, such as children, the elderly, or those with mobility challenges. Other vulnerable groups included people who had depleted assets before the flood, such as the unemployed, and those who had restricted access to participation in society, such as illegal migrant workers.

The damage inflicted by the 2011 flooding has been attributed to a combination of nature, poor governance and weak land-use planning (Boonyabanacha and Archer, 2011; Pongsudhirak, 2011).

Pre-positioning trust, resources and skills

Before the 2011 flood struck Bangkok, 10 years of systematic settlement and squatter upgrading had taken place in the Bang Bua Canal, through what can be viewed as an area-based approach. In this context an area-based approach is understood to be geographically located, participatory and multi-sectoral (Parker and Maynard, 2015).

While the programme had different degrees of success in each of the 12 neighbourhoods, it increased the levels of flood preparedness overall by pre-positioning trust in relationships both internal and external to the neighbourhoods. For example, neighbourhood savings groups were formed and legally registered as cooperatives. The cooperatives then entered into agreements with the national government to rent the land they were on and given access to loans to upgrade their houses.

Locally-based external stakeholders supported the upgrading process. Architects from neighbouring universities assisted with designing housing prototypes while the Community Organizations Development Institute (CODI), a public organization under the Ministry of Social Development and Human Security, facilitated the planning process. Negotiations were held with a nearby military base around the development of new roadworks through the base to the Bang Bua Canal; and advocacy with urban planners and other local authorities to adapt policies to meet the needs of the canal residents took place. Through newly formed relationships and transparent governance mechanisms, the ability for collective action and a deep sense of confidence in the neighbourhoods was developed.

Before the flooding struck, CODI provided the Bang Bua Canal Network – a network of 12 neighbourhoods – a grant of 75,000 Baht (US\$ 2,150) in anticipation of its potential impacts. The network chose to purchase one boat per neighbourhood and to pre-position food and other essential supplies, rationalizing that transportation, alongside basic needs, was a key priority for canal dwellers. Less than one month before the first flood struck, neighbourhood leaders and other volunteers from

along the canal had travelled more than 230 kilometres (143 miles) to assist with flood-response activities in Nakhon Sawan, a city in northern Thailand. Several weeks later, Bang Bua Canal dwellers put the experiential learning into practice by calling for the evacuation of vulnerable groups before the flood, sharing information about the locations of evacuation centres and pre-positioning supplies.

An area-based flood approach

The Bang Bua Canal Network quickly set up its own help centre, which collected and distributed donations for the 12 neighbourhoods in the network. The help centre, located in a two-storey community building, shared information updates, sought in-kind donations, and harnessed existing relationships within the network to ease the impact of the flood. For example, the help centre recorded information regarding the needs of different neighbourhoods and the path of the flood. Individuals in the network devised innovative ways to harness new potential from pre-existing relationships with various external stakeholders: local politicians donated food and money; the nearby military base assisted with transportation, food donations and information sharing; the police donated small rafts; and universities sent students with specialized skills, such as medical practitioners and engineers, to advise on ways to prevent illness and electrocution.

Most donations were dropped off at the help centre where items were sorted and redistributed according to differing needs within the various neighbourhoods. One of the larger neighbourhoods put in place a system whereby one individual was responsible for representing the needs of approximately five houses. When donations arrived in that neighbourhood, the representatives were asked to be present when opening and distributing goods in an effort to make the process fair, transparent and needs driven. This system was originally set up when the neighbourhood embarked on upgrading activities in 2005; it was later adapted and applied to the flood situation.

The neighbourhood response

A number of the neighbourhoods in the canal prepared for the flood by setting up food kitchens in spaces with minimal flooding, such as bridgeways, public roads or the second storey of community centres and health clinics, constructed with support from NGOs such as World Vision Thailand. Canal dwellers became volunteer cooks, serving up hot food purchased through neighbourhood savings groups that had put aside money for emergencies such as this. In the first seven days of the flooding no other form of assistance was available, making the funding from the savings group a crucial mechanism for survival.

At a later stage political parties set up food kitchens on bridges and elevated roads, removing the pressure on the neighbourhood savings groups. Some of the most vulnerable people – those living in one-storey homes as well as those with mobility restrictions – found it too difficult to be at home and moved to evacuation centres. Those who had rebuilt their homes with loans acquired through the savings groups were able to live in the second storey of their home for the duration of the flooding.

Reflecting on the flood experience, one neighbourhood leader explained the importance of being able to self-organize, anticipate and adapt, not only as a neighbourhood but also as an entire area faced with the same challenges. He said, “Our process is run by our community. We know best what we want, how to manage it and what we are facing. This [Bang Bua Canal] network offers power and support for negotiation... The network has been good for both the giver and the receiver.”

This example illustrates that urban disaster resilience can be understood as the actions taken before and after a disaster, with the disaster itself seen as a test of resilience (Sitko, 2016). Flooding was not a common event in the Bang Bua Canal, demonstrating that it is important to mitigate chronic and disaster risks in order to prepare for uncertain events that might surprise us (Boin et al., 2010). In other words, it is important to create an environment that is able to fail safely by maintaining its basic functions without causing the entire system, be it a neighbourhood or a city, to collapse. ■

Using community participation and *concertación* for better anticipation and resilience

Community participation has important benefits, such as “information and ideas on public issues, public support for planning decisions, avoidance of protracted conflicts and costly delays, reservoir of goodwill that can carry over to future decisions, and spirit of cooperation and trust between the agency and the public” (Cogan and Hertberg, 1986). There are various forms of participation, such as individual and collective, organized and informal, institutional and non-institutional. This chapter (and indeed this report) supports a transformative approach to participation (which is understood as essential for communities to be truly resilient), shifting existing power structures by ensuring decision-making is more democratic and inclusive, and by strengthening participants’ capabilities, rather than merely improving existing conditions. Participation also has its pitfalls, such as the risk of leaving people out (deliberately or otherwise), and the over-representation of some interested actors leading to their getting more benefits (Hordijk et al., 2014).

Effective approaches to participation avoid focusing on key actors and interest groups alone, observe institutional or formal participation (as well as citizens’ self-mobilization), and use traditional ways of communication. Online and social networks can be a helpful means of participation, too. Several government agencies, municipalities and civil society organizations in Peru and Brazil use online discussions and voting for their participatory budgeting, planning and management process. Miraflores District in the Municipality of Lima used an electronic voting system for participatory budgeting during 2016. Many have developed mobile phone apps to facilitate citizen reporting on what is happening in their streets and localities. Citizens can alert their District Municipalities using apps. A specific app has been developed by *Aliança pela Água* (Alliance for Water) (2016) in Sao Paulo for citizen monitoring of potable water scarcity. Municipalities also use webpages and blog posts to inform and communicate with citizens, which can make them feel forced to respond publicly to blog posts from citizens as well. In addition, in response to 2015–2016’s El Niño, several apps have been developed to be used by children, allowing them to play with different scenarios that help them better understand the impacts of climate change.

From the Peruvian experience – despite a history of authoritarian governments which critique participation as being too expensive and time consuming – the process of democratization has advanced and fostered active spaces for the institutionalized culture of participation. This has led to the much broader *concertación*, which, ideally, is based on an equal say in decision-making between different social, economic and governmental actors. Even though it is not an easy task, such an approach opens inclusionary and dynamic opportunities for dialogue and deliberation, which, if successful, can help to improve power differences.

These processes are a result of active citizenship, with the engagement of civil society organizations and social movements. In a way, this is a means for institutional participation, which can be understood “as any type of inclusion of citizens’ voices, either as members of the public or as actors in any stage of policy and decision-making including implementation and budget allocation” (Wesselink et al., 2011). The term ‘actors’ here is preferred, instead of stakeholders, because to limit the actors to their stake or interest is a rather narrow understanding of their characteristics. While their stake is often based on their value systems, the term ‘actor’ emphasizes people’s *agency* (Hordijk et al., 2014).

As noted above, in Peru, *concertación* involving multiple actors at multiple levels, as well as at different geographical and territorial scales, has become mandatory in various contexts (Miranda et al., 2011). A key characteristic is ‘learning by doing’, combined with the social construction of knowledge through various decentralized social organizations that join efforts to achieve shared goals. The latter implies a highly sensitive and complex process of dialogue, negotiation, *concertación*, conflict management and consensus building (Miranda, 2015). These processes are a result of very active citizens, CSOs and social movements. Even though agreements may not be mandatory, once reached within these kinds of processes, such outcomes are rarely dismissed. It can take a long time to implement them, but they will generally be implemented. If not, such a failure can become a political scandal (Hordijk et al., 2015).

Community participation can, however, be particularly challenging where local capacities and resources are limited, and the policy environment is fragile. Such conditions have been experienced by Nepal following the 2015 earthquakes. Box 4.4 illustrates how underlying factors can hamper resilience-related efforts.

BOX 4.4 Struggling for resilience: Nepal after the earthquakes

The impact of two earthquakes that struck Nepal in 2015 has ground the country's annual economic growth to almost zero per cent. Almost 9,000 lives were lost (Government of Nepal, 2015). A few months later, from September 2015 to January 2016, Nepal suffered a near-complete trade blockade enforced by regional political parties, allegedly with unspoken support from India, which were said to be displeased with the way a new constitution was evolving (India denied this, stating that blockages were imposed by ethnic protesters within Nepal). The blockade crippled the landlocked economy, given its dependence on India for essential fuel, foods and medicines.

While the international community was largely silent over the humanitarian consequences of the trade blockade, its response to the Nepal earthquake was generous. The spontaneous contribution of Nepali security forces and the civil service, the Nepalese diaspora and non-state actors was complemented by a large inflow of foreign assistance in person, kind and cash, with India and China particularly noted for their substantive gestures.

At the *International Conference on Nepal's Reconstruction* held two months after the first earthquake, development partners pledged 100 per cent of the public sector needs (US\$ 4 billion) identified by the National Planning Commission for early recovery. Soon after, however, internal political wrangling and legal battles over the formation and leadership of the National Reconstruction Authority slowed recovery, which was aggravated by the trade blockade.

On the first anniversary of the first earthquake, less than half of the pledges had actually been converted into signed agreements, and only a fraction of that had been spent. This was partly a result of diverted attention as the political leadership switched its efforts to issuing a new constitution and managing the recovery, together with a change in government.

External partners, too, faced constraints on manoeuvring their fiscal input. First, there was a long gestation period for project design and approval; second, it took considerable work to align immediate post-disaster needs with rigid budget cycles and calendars of individual countries; and third, funds were often merely re-routed from pre-committed projects, with few additional dollars allocated to fresh needs.

In Nepal and elsewhere, for some of the reasons cited above, international aid mechanisms aimed at post-disaster recovery and reconstruction have generally been found deficient. At the Third UN Conference for Financing for Development in Addis Ababa in July 2015, a number of low-income countries voiced their support for a special fund for the weakest and most vulnerable nations. Nepal's ministerial delegation at the conference called for the international community to commit to creating a global fund aimed at mitigating crisis and building resilience.

When the existing practice is deficient, reform is needed with the search for new models that, as a top priority, restore the balance between post-disaster response and reconstruction and pre-disaster investment. As mentioned elsewhere in this report, post-disaster funding outstrips pre-disaster risk reduction efforts. Our priorities are confused. This is a result of perverse incentive: crises resolved look better than crises avoided. Preparation also requires deep knowledge of where the risks lie, how their probabilities can be lowered, and to insure against them. Poor countries like Nepal lag on all these fronts.

In the final analysis, nothing substitutes for nationally-driven physical and human investments in preventing disasters and coping mechanisms. Low-income countries need to be serious about the business case for building resilience, which is about saving lives and preventing development setbacks. In Nepal, the earthquake and the blockade were estimated to have pushed some 700,000 people below the poverty line (Government of Nepal, 2015). Low-income countries also need to make a case for international public-private partnerships at the national, regional and global levels. While the role of the state remains critical, the private sector can bring its market-based solutions, and international organizations are best placed to coordinate and facilitate the flow of funds and know-how.

In Nepal, despite material poverty, a few basic investments that had been made for preparedness did result in the post-earthquake response being less chaotic than it would otherwise have been – the National Emergency Operations Centre (NEOC) and a Natural Disaster Response Framework were in place, for example. Regional intergovernmental bodies such as the South Asian Association for Regional Cooperation (SAARC) should increasingly focus on transferring best practice and building capacities among member states. In addition, globally, there is a need for a Catastrophe Preparation and Mitigation Fund, aimed at poorer countries, that offers international insurance mechanisms and re-orientes humanitarian aid away from the orthodox development apparatus to make it more effective and agile. Above all, emphasis is needed in *much more* pre-disaster preparedness, and better post-disaster recovery; that is, better resilience. ■

Rehearsing the future through scenario planning

Scenario planning techniques, originating from military planning, are used to anticipate and plan for plausible futures. They are essentially concerned with *rehearsing the future*. Scenario planning first emerged after World War II as a method of war games analysis. In the 1970s, scenario planning was famously used by the oil company Royal Dutch Shell to good effect; the company had scenario-planned a version of the 1970s' oil crisis before it took place, and as a result substantially improved its market standing in relation to its less-well-prepared competitors.

Since then, scenario planning has been widely used by planners and communities alike to consider outcomes of decision-making. Scenarios are not forecasts: they provide insights, and help to anticipate plausible futures. Leis (2014) notes that ecologically-oriented scenarios have been undertaken by a number of organizations, including the UN, DFID, The Stockholm Environment Institute and the IPCC “to determine future greenhouse gas emissions, biodiversity conservation and ecosystem services”.

Van der Heijden (2000) notes that scenario planning “has something to offer in terms of both an anticipatory and a process perspective, both in line with the critical realism paradigm. We can either see it as a way to improve our understanding and anticipation of the future, or a way to help institutional groups to start moving forward more skillfully in uncertain times. Keeping both perspectives in mind helps us

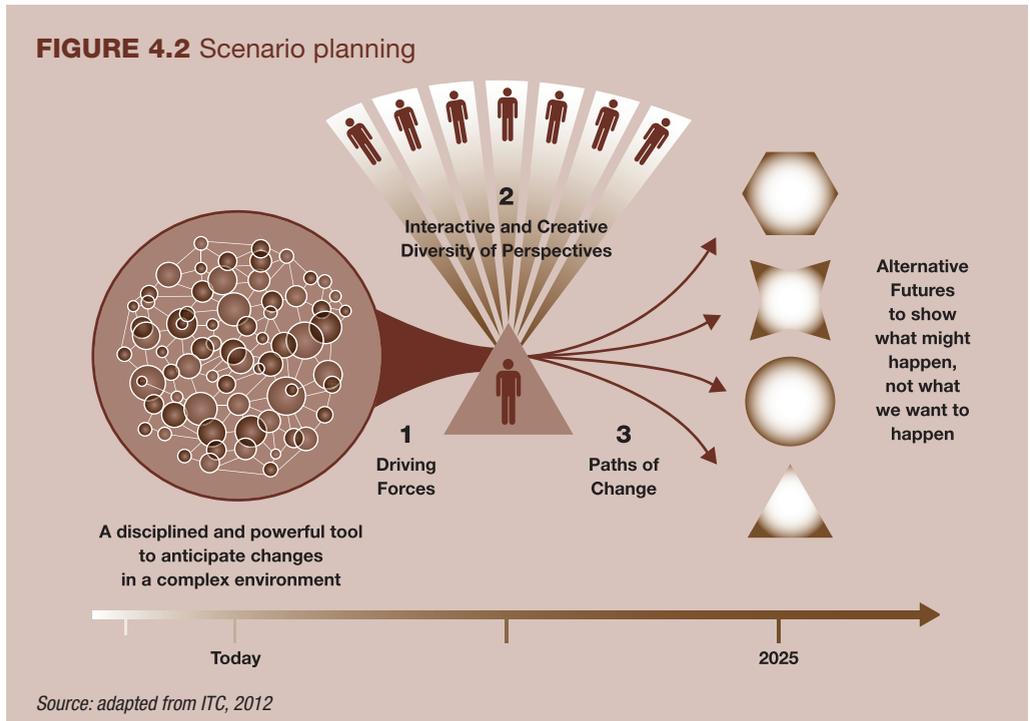
to remain aware of the fact that there is no single right answer. The underlying dilemmas cannot be resolved, but require continuous active management.”

These techniques are based on a set of assumptions that enable one to ‘travel’ into the future and allow a glimpse into how a situation might progress (or not). Scenarios are based on a set of conditions, variables or driving forces agreed upon by those undertaking the scenario planning exercise. Such planning helps ‘design’, ‘create’ and anticipate realistic but robust alternative futures, helping to manage uncertainty by reducing unpredictability. Scenarios therefore differ from forecasts because they allow the incorporation of discontinuities, new phenomena and innovations.

Scenario planning can be organized by experts, governments, business teams, communities or as academic exercises. There are usually three stages: (1) the identification of the ‘driving forces’, each defining the characteristics and options or alternative developments (for each driving force); (2) the analysis of the driving forces’ interdependencies and definition of the plausible scenarios themselves; and (3) feedback and communication. Scenario planning is usually multi-hazard oriented and is a collective multi-actor exercise involving small or larger groups that recognizes inputs from their different knowledge sets; this input is communicated through storylines, films, two- or three-dimensional mapping exercises, or by other means.

Such repetitive processes in a wider framework of action-research highlight the need to keep including all actors in the cycle of events where knowledge and decisions are made, constantly evolve and continue to be shaped (such as expert meetings, workshops with key actors, community meetings and seminars with society in general). These actors are involved in the process of collecting, confirming and modifying the scenarios through consensus-building practices. The quality of the scenarios is conditioned by the capacity and knowledge which each participant brings into the process; this is why a wide range of participation with a variety of voices is needed (Khan et al., 2015).

With the information collected from the scenario planning exercise, it is possible to define the best strategic actions to achieve the desired or preferred scenario, prevent the negative ones from happening, seize opportunities and even to stimulate strategies for enabling positive, plausible outcomes to be reached. From this, policies, strategies, management tools and concrete proposals for decision-making can be developed. Although the process does not guarantee having the political will or community commitment necessary to take the desired actions (as this will depend largely on who engages in the processes), raising awareness of the potential paths for future development is still a good starting point to generate change.



The following illustrates one example of scenario planning. In Metropolitan Lima, two scenario planning exercises were undertaken. The exercises engaged the complex landscape of uncertainty and multiple risks that exist in the city, due largely to its disorganized and uncontrolled growth. The Municipality of Lima led one of the exercises, while the other involved the Water Company of Lima, SEDAPAL. An analysis was carried out with the aim of understanding Lima's hydro-climatic vulnerabilities and the interactions between water governance and climate change, as well as the perception and level of acceptance of risk. The exercises included an analysis of government, civil society, community, private sector and academia (looking at multiple scales), as well as spatial-territorial dimensions (from the metropolitan city area to the local and neighbourhood level, combined with the macro-regional level and larger river basins). The analysis contributed to the understanding of processes, complexities and local dynamics (Miranda Sara and Baud, 2014).

The main threats were identified for each scenario, relating to future climate change, which were presented and validated by key actors and metropolitan experts. The scenarios were:

- heavy rain: tropical conditions with intense rainfall, temperature increase of at least 2°C (35°F) and increase in the water flow by at least 13 per cent
- drought: cold, arid conditions with a reduction in rainfall and water flow, almost permanent drought and low temperatures, similar to La Niña conditions

- mixed: a higher frequency of El Niño events with spikes of heavy rainfall alternated by nearly permanent drought conditions.

The spatial relations between exposure, inequality and multiple vulnerabilities, exacerbated by extreme climatic conditions, were explored, while an analysis was undertaken of stresses that are already happening, which were either eroding, altering or strengthening respective systems and their capacities. Participants contributed to workshops, focus groups and interviews, and through these the results were systematized and driving forces identified to build scenarios for Lima for 2025 and 2040. Twelve main water-related forces driving change in the water sector were identified and agreed upon: form of government; water company management; water tariffs; population growth; urban poverty; water consumption; catchment management; urban form; water deficit; wastewater treatment and reuse; water infrastructure; and climate change (Miranda and Baud, 2014). With this series of consultations and expert analysis, minimum agreements were established that allowed for the approval of the *Municipality's Metropolitan Strategy on Climate Change* in 2014 and the *Action Plan for Water and Sanitation in Lima and Callao*, which contributed to the Water Master Plan of Lima approved in 2015 by SEDAPAL.

Through this process, vulnerable communities in central and peripheral zones in Lima were made visible. Barrios Altos and José Carlos Mariátegui were identified as priority neighbourhoods, both selected to build participatory scenarios outside of the neighbourhood itself. This added to the analysis of the concepts of risk traps and the accumulation of daily risk, as well as innovative technologies for the three-dimensional visualization of scenarios using digital simulators. Currently, the team of the organization Cities for Life Foro leads a series of multi-actor workshops in both neighbourhoods, with support of 'Clima Sin Riesgo' (roughly translated as 'safe climate', and written 'cLIMAsinRiesgo'), a project financed by CDKN and led by The Bartlett Development Planning Unit. These workshops will result in the development of action plans and the implementation of pilot programmes.

Effective scenario planning – and a wider understanding of anticipation – therefore relies on a good knowledge of context, local capacities and the range of actors. One of the most challenging settings in this regard is that of Small Island Developing States (SIDS), which, in addition to the effects of climate change, also face a number of hazards. Box 4.5 highlights the challenges faced by Fiji in 2016 following Tropical Cyclone Winston.

BOX 4.5 Small-island preparedness: learning from Fiji and Tropical Cyclone Winston

Disaster preparedness, a key component of resilience, is not simply a blanket term intended to communicate a message to 'just build stronger'. Instead, preparedness requires a process of critical evaluation of current risks and hazards in conjunction with lessons learnt from past disasters in order to understand where additional support is most needed. This support ranges diversely from training national staff through to building flood levees (embankments) to protect local communities. Furthermore, disaster management is contextual, with each location presenting its own unique challenges. Therefore, reflecting on the response to Category 5 (severe) Tropical Cyclone Winston, preparing the island nation of Fiji for future risks requires not only an understanding of the unique conditions of such a nation but also a reflection on the lessons learnt to date from this disaster.

The primary differential for Fiji, and its Pacific neighbours, in preparing for naturally-triggered disasters is how to increase community resilience when many islands are isolated from one another. Fiji has 332 islands, 106 of which are inhabited, comprising 1,171 villages. Conversely, with over half the Fijian population also living in urban settings, the nation faces both a heightened vulnerability to natural hazards because of the strain created by urban growth, *as well as* the potential for widespread damage in remote communities.

Considering disaster preparedness more broadly, enabling each community to have its own disaster management plan is generally accepted as good practice. However, in island communities, local disaster management plans are of paramount importance. After Tropical Cyclone Winston struck, many villages were cut off from each other, in difficult-to-reach places, and had to be self-sustaining until help could arrive. Considering the geographical isolation of many of the outer islands of Fiji, undertaking damage assessments (a critical input required for the emergency response) presented challenges. Similarly, once requests for help had been received, the distribution of resources became difficult. To deliver provisions, the government utilized aircraft and naval support provided by Australia, New Zealand and France.

Fiji has a well-established National Disaster Management Office (NDMO), which consists of a full-time team who implements disaster preparedness for all manner of disasters, most significantly drought during the dry season (April to November) and tropical cyclones in the wet season (November to April). NDMO provides training to other ministries and communities about how to prepare for and respond to disasters. Similarly, it leads a media advocacy programme, primarily through national radio stations and television broadcasters, to promote awareness on natural hazards and help people anticipate the potential consequences. The isolation of Fiji's islands means that these media are also used as early-warning systems for an impending disaster. In addition, NDMO has completed training for 200 villages through the Pacific Community Integrated Disaster Risk Reduction Programme, which helps villages establish their own disaster committees, experience disaster simulations, and produce their own disaster plans.

The Fijian Government also has a principal operating structure and disaster management plan for when a disaster strikes. When Tropical Cyclone Winston caused a national state of emergency on 20 February 2016, NDMO became the centre for operations, housing the National Emergency Operations Centre (NEOC), which received updates from Divisional Emergency Operations Centres about what was happening on the ground. This information was then utilized in the response and compiled into daily briefings that were passed up to the National Disaster Management Council, and ultimately to the Prime Minister.

This pre-designed structure – an example of effective preparedness planning – was a primary reason that Fiji responded so quickly to the effects of the cyclone. Much of the damage from Winston was sustained in the outer islands. In preparation for such an event, Fiji has ‘divisional databases’ containing information about on-the-ground personnel and resources, such as the number of operating emergency shelters. Having this data allowed the NEOC to provide accurate information to the current operations team, which meant that aid resources could be appropriately distributed to the villages in order of priority. Furthermore, the existence of the NDMO and the disaster response being government led meant that international aid could be channelled to where it was needed most through one coordinating office. In terms of preparation, all those involved in the response for Winston were also able to gain invaluable experience in the response procedure to the strongest recorded cyclone that Fiji has suffered; this will be utilized in preparing and training future personnel.

Winston has influenced future preparedness too, with 48 villages deciding to either relocate permanently or ensure that any future development is away from the coastline. Fiji is also working on integrating the internationally recognized cluster system into its disaster management programme so that it operates at a local, divisional and national level. In addition, updated legislation concerning the construction of new dwellings is currently sitting with government, to ensure that the national reconstruction programme encourages future resilience in anticipation of another Category 5 cyclone.

Although Fiji has established protocols for preparation, Winston has shown that some areas need further attention. It became evident that the outer islands required a reliable medium of communication, a stable supply of electricity and basic means of self-sufficiency until help could arrive. Satellite phones and generators were some of the first resources to be delivered in order to re-establish lines of communication and enable detailed requests for help to be received. However, these necessary emergency resources, as well as other aspects of preparation – such as running disaster preparation training courses, updating and enforcing building codes, training personnel how to build to new specifications, providing the robust materials to construct such structures – all come at a cost. This monetary strain, coupled with the losses incurred in primary industries such as agriculture and tourism after a disaster, makes it difficult for island nations to recover in a manner that incorporates future preparedness. Fiji is becoming a leader in the Pacific region for disaster preparedness. However, with cyclones and other disasters triggered by natural hazards a constant threat and the nation facing continual pressure to accommodate both urban growth and geographical isolation, establishing community resilience through preparation will remain a constant item on the agenda of the NDMO. ■

Community-driven action planning for anticipation

Another methodology which can be used to build community-level resilience is action planning, an approach developed within urban planning as “a framework guided by the belief that people are creative and capable, and can and should do much of their own investigation, analysis and planning” (Hamdi and Goethert, 1992). Action planning enables the organization of multiple actors to anticipate and prevent threats, helps them to protect their lives, houses and livelihoods, and, most importantly, to respond properly during an emergency.

At least four phases are usually used in action planning: (1) risk identification and evaluation with simple instruments, promoting the interaction between communities, institutions and expert knowledge and experience (surveys on endangered families, workshops, development of hazard maps) to generate anticipation and community awareness; (2) coaching and training to apply these simple instruments as well as on protection and emergency reaction, response and rescue (e.g., shelter management and first aid) which results in the formation and equipment of the locality’s community volunteer brigade; (3) *concertación* with a range of actors to develop and prioritize concrete and operational plans; and finally, (4) to assess and repeat the cycle to disseminate and promote its ongoing use with public relations materials. Action planning therefore relies on communities and civil society organizations having a good knowledge of the local reality – they become ‘the experts’.

Well-informed actors can participate actively and share accurate information for effective design and implementation of plans. There are a number of experiences where local communities have connected their action plans with budget allocation and implementation, participatory budgeting being a well-known one. Started by Porto Alegre Municipality in Brazil and subsequently adopted throughout South America and elsewhere, participatory budgeting is a political and management instrument that allows regional and local authorities, together with the civic society organizations, to decide how municipal financial resources will be spent, especially the ones connected with the vision and objectives of their sustainable development plans. Participatory budgets aim to guarantee transparency and citizens’ control, the modernization and democratization of public management, the strengthening of the democratic governability, and the building of social capital, allowing citizen participation in public planning and management.

FIGURE 4.3 Community action planning workshop, Lima, Peru. The three-day workshop invited local stakeholders (market traders, the fire services and local government representatives) to come together to identify joint activities to develop ‘action plans’ to reduce fire and earthquake risks.



Photograph: David Sanderson

Conclusion

Anticipation involves acting for the future in the present. Effective anticipation requires a shift away from assuming that the future will be a repeat of the past. Climate change, urbanization and population increases are causing new challenges to emerge which call for better anticipation. By definition, resilience is concerned with the future, and therefore links actions before crises to the (hopefully improved) state following such events. Anticipation is, therefore, at the core of resilience-building approaches.

Anticipatory systems and proactive resilience-thinking need to make use of inclusive and innovative approaches such as scenario planning and action planning to enhance socially-supported resilience strategies and influence policy development and decision-making. Both these methods reinforce a people-centred approach that is at the heart of much resilience-thinking; scenario planning aims to build community capacity to prepare for – and even avoid – future shocks and

stresses, while action planning relies on local capacity and knowledge (and, participatory budgeting concerns, among other things, to improve accountability of public finances through local scrutiny and engagement).

Within each approach, the process of socially constructing knowledge, which implies incremental learning to create (and thereby rehearse) future scenarios, can strengthen social ties, trust and legitimacy among different actors – despite what may seem at first to be contradicting interests. Nonetheless, it is important to recognize limitations and potential risks, such as power and knowledge challenges, practical concerns with regards to political discontinuity, and a lack of budget allocation and time, which may affect the outcomes of such processes.

Chapter 4 was written by Liliana Miranda Sara, Executive Director, Cities for Life Foro, Lima, Peru, and Dewald van Niekerk, Professor and Director, African Centre for Disaster Studies, Potchefstroom, South Africa. Box 4.1 was written by Aynur Kadihasanoglu, Senior Advisor, Urban Disaster Management at American Red Cross International Services, USA; Box 4.2 by Jennifer Jalovec, Director, Disaster Management in Fragile and Urban Contexts, World Vision International, Nairobi, Kenya; Box 4.3 by Pamela Sitko, PhD, Global Urban Technical Advisor, Disaster Management at World Vision International, Sydney, Australia; Box 4.4 by Swarnim Wagle, former Member, National Planning Commission, Government of Nepal, Kathmandu, Nepal; and Box 4.5 by Akapusi Tuifagalele, Director, National Disaster Management Office, Fiji, and Matthew McLaren, Research Scholar at the University of New South Wales (UNSW), Sydney, Australia. Inputs on climate change and resilience were provided by Laban Ogallo, Director, IGAD Climate Prediction and Application Centre (ICPAC), University of Nairobi, Kenya.

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Inner resilience: mental health and psychosocial support

“A good half of the art of living is resilience”

Alain de Botton

Crises from natural hazards, conflicts and forced migration represent particularly complex experiences that diminish quality of life by impacting on both individual and community support systems, causing distress and suffering, and overwhelming resources. Post-crisis conditions threaten human dignity in situations of sub-standard living conditions, scarce food supply, and shelter shortages, with the potential weakening of community capacity for joint action, and increased insecurity (Cueto et al., 2015). Local populations need to deal with both acute events and the accumulated problems aggravated by a crisis such as poverty and loss of social networks. Consequences can continue for years, resulting in secondary stressors of job loss and reduced development opportunities.

Psychosocial repercussions can be long-lasting (Goenjian et al., 2011) as the long-term impacts of disasters can undermine well-being and threaten peace and human rights. Empirical evidence reports that mental disorders and psychosocial problems are significant public health concerns in humanitarian settings (Tol et al., 2011) with most of the affected population experiencing considerable distress, but only a minority experiencing symptoms or mental disorders that will impact on their daily functioning and may require access to specialized care (WHO, 2014; 2016).

The impact of disasters on mental health and well-being varies greatly. The majority of an affected population will not suffer from long-term negative impacts on their health. Research suggests that although disasters put families, neighbourhoods and communities at risk, the majority of adults and children (Kronenberg et al., 2010) will show adequate adaptation or resilience over time, i.e., most people will demonstrate an ability to resist or recover (Norris et al., 2008). This capacity for recovery is widely defined as processes of resilience or successful adaptation after potential trauma or severe stress (Norris et al., 2009). In some populations who have experienced multiple crises, resilience processes may already be present and can be built upon. The majority of the affected people in major crises do not need specialized mental health care but many will benefit from psychosocial support (OPSIC, 2015). Psychosocial support is a vital part of humanitarian response when it is combined with local psychosocial support initiatives and equally assists individuals and communities to overcome and deal with psychosocial problems that may have arisen from the shock and effects of

Nukubalavu village, Savusavu District, Fiji, March 2016. Fiji Red Cross Savusavu branch president Ateca Nayasi is listening to Mareta Vosamosi while she tells her story of sheltering a pregnant neighbour from Tropical Cyclone Winston. Mareta's home was destroyed by the cyclone. "It is not an easy job, hearing people's stories," Ateca says. Psychosocial support was identified as a key need after the Category 5 storm, the strongest recorded cyclone to hit Fiji. The storm killed 44 people and destroyed or damaged 32 000 houses. IFRC is training Fiji Red Cross volunteers in psychosocial first aid, so that they can help people in their own communities to recover from the storm.

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Resilience in individuals is demonstrated by culturally-defined good mental health and developmental outcomes, despite exposure to significant adversity (Luthar et al., 2000; Rutter, 2006). In both psychosocial support and risk reduction activities it is important to understand the importance of differences in resilience across socio-cultural contexts and to appreciate what local communities understand about resilience (Tol et al., 2013). This in turn can offer culturally-appropriate support to psychosocial support and disaster risk reduction endeavours. How people assess adversity and enact resilience processes is culturally specific and has an effect on their capacity to adapt (Ungar et al., 2013) – what is regarded as resilience in Ivory Coast differs, in part, from resilience as demonstrated in Cambodia or Italy. There is a relationship between individual and community resilience – one helping to sustain the other. Research suggests that a supportive socio-ecological context is at least as important a determinant of resilience as individual variables, and should be a central focus for interventions promoting resilience (Tol et al., 2013; 2015).

Community resilience post-disaster concerns the adaptability of the environment in the face of threats so as to continue sustainable development (Kulig et al., 2013). Elements of community resilience that promote sustainable development include: viable economic development (stability, growth, equity of assets, and distribution); social capital (membership of and access to networks, and functioning social network interaction); clear and accessible information and communication (see Box 5.1); and community competence (collective efficacy, trust, planning and decision-making) (Norris et al., 2008). Community resilience is offset by how risks in the community (e.g., poverty, conflict and hazard risk) interact with resources (Fordham, 2016). Community resilience depends on whether or not these sets of resources are robust, can be substituted by others and are able to achieve goals rapidly so as to avoid disruption.

The well-being of a community is recognized as part of resilience (Gibbs et al., 2015). A common understanding of what defines psychosocial well-being and resilience may differ not only from country to country but also in different populations within the same country. Before planning a psychosocial response, it is necessary, therefore, to understand what concepts mean locally for the particular population. However, there appear to be some commonalities in well-being and resilience processes that should also be incorporated into psychosocial support intervention design. For example, effective family and social support and community acceptance (Betancourt et al., 2013) influence resilience processes and well-being and can be supported. Paton (2013) discusses the importance of trust, a sense of belonging, and community participation in building resilience and promoting disaster risk reduction.

BOX 5.1 Information as the lifeblood of community resilience

“The population needs therapy, and we must learn to laugh again.”

– Patrick Moussignac, Radio Caraibes Station Director, Haiti

The importance to traumatized communities of re-establishing trusted and familiar local media and communication systems in disaster zones has been evidenced repeatedly. Members of the Communicating with Disaster Affected Communities (CDAC) Network, which comprises more than 30 humanitarian and media development agencies, have found, for instance, that a lack of information in crisis contexts is a significant contributor to stress and anxiety for recovering groups, and that restoring channels for them to talk about their experiences can provide them with strong psychosocial benefits.

CDAC Network members are now pioneering new approaches to understanding the properties of communication systems critical to disaster risk reduction and community resilience. Working through local partners and researchers, they are also building an evidence base on how communication can make resource-poor communities better prepared when faced with major shocks and stresses.

Systems and communication

Diagnosing the patterns and health of complex systems that support information flow within communities is at the heart of an effective information ecosystems approach. Just as natural ecosystems are complex adaptive systems, information ecosystems are similarly complex, and include actors such as media, producers, consumers, curators and sharers, and critical elements such as information infrastructure. Above all, information ecosystems are dynamic; the information ecosystems approach can provide us with insight into how risk information flows through channels, the dynamics of access to it by marginalized communities, whether it is validated or disqualified by factors such as social trust and the role of influencers, and the degree to which it triggers social action or behavioural change (Internews, 2015). The information ecosystems framework focuses on eight critical dimensions relevant to community resilience: information needs, information landscape, production and movement, dynamic of access, use of information, impact of information, social trust and influencers.

In order to diagnose the health of the information ecosystems of communities exposed to shocks and stresses, and then to find concrete ways to restore or improve them to safeguard community resilience, researchers for Internews, a media NGO, developed a practical mapping tool, Mapping Information Systems, that was deployed in the context of the 2014 Jakarta floods. The researchers using the tool found, for instance, that community-level information needs for flooding preparedness had never been assessed and that the community influencers engaged by government and responder organizations were not accessible nor trusted by all groups. The researchers proposed working with alternative influencers (e.g., rickshaw drivers) to consult with members of marginalized communities.

Showcasing collective efficacy to support resilience behaviours

BBC Media Action's *Amrai Pari* is a reality TV-based series that allows communities across Bangladesh to 'see' other communities taking action in the face of climate-linked shocks and stresses. Transmitted by the state TV broadcaster, the series covers easily-replicable demonstrations of resilience-enhancing actions such as the raising of the plinths of homes exposed to river flooding. The design of *Amrai Pari* is founded on a robust evidence base of people's daily experience of climate shocks and stresses created by the world's largest climate-resilience study that surveyed the experience of 33,500 people across seven Asian countries.

Of those who watched *Amrai Pari* (5.9 million people), an average of 81.8 per cent felt that the series improved their understanding of resilience issues. Specifically, 79.1 per cent felt that the programme improved their understanding of how to deal with specific 'shocks' (i.e., cyclones) and 84.5 per cent felt that the programme improved their understanding of how to deal with specific 'stresses' such as problems of availability of food, water, fuel and housing.

The key impact measure was whether or not audiences took action as a result of watching the series. Some 36.5 per cent of the *Amrai Pari* audience reported having taken action to deal with shocks and stresses such as cyclones, river erosion, floods and tidal waves, and related food, water and fuel problems, as a result of watching the programme. This relatively high level of action is supported by the way in which audiences reported having discussed the programme with others (50.7 per cent of those reached). Among those who discussed it with others, they mostly did so with their neighbours (45 per cent), their family (39 per cent) or their friends (30 per cent).

Many respondents to the local research team evaluating the impact of *Amrai Pari* said that seeing people on the programme collaborating to cope with hazards encouraged them to do the same, regardless of the community context and region mentioned in any one programme. The team found that localized power dynamics can facilitate as well as constrain action. There is clear evidence, however, that national broadcast initiatives such as *Amrai Pari* which blend high-quality audience research with the power of peer demonstration can provide valuable psychosocial support to communities by making them feel better equipped to cope with the emerging shocks and stresses to which they are increasingly exposed. ■

How has psychosocial support evolved in humanitarian action?

Initially, mental health and psychosocial interventions were often too focused on trauma reactions and on individuals, and effective coping, resources and resilience processes in children, families and communities were frequently not acknowledged (La Greca et al., 2013). However, resilience after adversity means more than just having an absence of symptoms. Also, there is some confusion in the field about definitions of key terms of psychosocial support or resilience that vary between and within aid organizations, disciplines and cultures (Patel et al., 2011). However, interventions have progressed recently in practical and

evidence-informed application. Psychosocial support interventions now endeavour to facilitate resilience within the context of multiple community systems and focus on local resources that promote resilience processes. Empowerment is important. This approach is based on the idea that if people and communities are empowered to care for themselves and each other, their individual and communal self-confidence and resources will improve (IFRC PS Centre, 2014).

Psychosocial support has evolved and now focuses on a resilience approach that acknowledges both risk and resources, promotes capacities, and endeavours to empower people and communities to cope with their situations and contexts (Wessells, 2015). There is now more consensus about what is needed to ensure effective psychosocial support interventions also. Hobfoll et al. (2007) reviewed and identified principles that could be applied to psychosocial support interventions in immediate and post-immediate responses to a crisis. The five principles cover the provision of: (1) a sense of safety; (2) promotion of calming; (3) self and community efficacy; (4) connectedness; and (5) the instillation of hope. Red Cross and Red Crescent National Societies are able to adjust these principles to their local cultural context and implement culturally-acceptable, community-based psychosocial support interventions.

Psychosocial support interventions have been a part of the IFRC approach for more than a decade and good practice guidelines in psychosocial support are now widely published. Key publications include the Inter-Agency Standing Committee (IASC) *Guidelines on Mental Health and Psychosocial Support in Emergency Settings* (2007), the *IASC Field Guide for Humanitarian Actors* (2010) and key principles within the revised *Sphere Standards* (Sphere Project, 2011). The IASC has defined mental health and psychosocial support as a complex term to refer to “any type of local or outside support that aims to protect or promote psychosocial well-being and/or prevent or treat mental disorder” (IASC, 2007). The IASC guidelines specify a minimum response to a range of mental health and psychosocial support domains, including a mental health and psychosocial support perspective within water and sanitation, food and nutrition, and education. Mental health and psychosocial support activities can now be considered a central element of humanitarian activity (Ager et al., 2014), and have been clearly defined within response to crises.

The aim of mental health and psychosocial support programming is to prevent mental disorders as well as promote and protect psychosocial well-being. A multi-layered, step-by-step approach is proposed, which includes practical and more specialized assistance so as to provide a spectrum of services, which is illustrated in Figure 5.2.

FIGURE 5.2 Services to improve mental health**EXAMPLES:**

Mental health care by mental health specialists (psychiatric nurse, psychologist, psychiatrist, etc).

Specialized services

Basic mental health care by public healthcare doctors. Basic emotional and practical support by community workers

Focused (person-to-person) non-specialized supports

Activating social networks
Communal traditional supports
Supportive child-friendly spaces

Strengthening community and family supports

Advocacy for basic services that are safe, socially appropriate and protect dignity

Social considerations in basic services and security

Source: IASC, 2008

People needing support at levels three and four (top of the pyramid) are also likely to benefit from psychosocial support and community-based activities. As well as promoting psychosocial well-being and facilitating resilience, psychosocial interventions can contribute to preventing mental health disorders. Psychopathology associated with crises has been estimated at around 20 per cent of a population experiencing the immediate aftermath of a humanitarian emergency (WHO, 2014), or varying from 15.4 to 28 per cent in a review of displaced populations (Steel et al., 2009). Often people who demonstrate symptoms are stigmatized and isolated so their well-being and capacity for resilience is improved by assistance with their reintegration into the community. Referral can be integrated within a psychosocial programme but treatment should only be undertaken by trained health workers. In recent years, evaluation of psychosocial support interventions has increased good practice.

A mental health and psychosocial support programme should now address multi-level intervention and can include:

- basic aid delivered with a psychosocial support perspective (i.e., shelter, respecting family and social bonds and safety considerations; food and water distribution, and first aid, delivered with cultural understanding and inclusivity)
- information (i.e., about what has happened, about the fate of loved ones, about normal reactions)
- social and emotional support (i.e., comfort, a listening ear, recognition of grief, compassion)
- practical help (i.e., legal and financial issues, household orientation)
- facilitation of community resources, networks, and connection
- mental health (i.e., adequate detection, referral avenues, and management)
- support to responders.

Building resilience in a population includes recognizing that volunteers and staff are often affected by the same disaster and that workers need support and supervision. This is important when crises occur in areas already suffering from conflict or chronic hardship. Several humanitarian organizations, including the IFRC PS Centre, have developed a toolkit for volunteer support. Multiple Red Cross and Red Crescent National Societies have instigated helper support. For example, branches of the Colombian Red Cross Society must have a team or a person who belongs to the psychosocial network and have psychosocial support groups for volunteers and staff that develop activities.

The above activities are listed in leading mental health psychosocial support guidelines for disaster settings (Dückers and Thormar, 2015).

Quality guidelines

Psychosocial support is a relatively recent addition to humanitarian response. However, steps have been undertaken to address challenges in practising interventions in the field. A set of quality standards for psychosocial support programmes have evolved from experience and best practice (IFRC PS Centre, 2014). These standards include:

- needs-based assessment
- active participation of the local community stakeholders in design, implementation and monitoring

- inclusivity
- focus on strengths
- coordination with other sectors such as violence protection, shelter and food distribution
- having sufficiently trained and supervised staff working in acceptable conditions.

Although progress has been made, existing mental health and psychosocial support guidelines are limited as they remain focused on the response phase. In addition, there have been suggestions that present guidelines need to have greater representation from Southern actors and initiatives within the IASC group (ODI, 2015). Finally, there continue to be gaps between guideline recommendations and practice in the field. Also, despite efforts to address needs by alleviating suffering and maintaining human dignity in providing psychosocial support, gaps continue to exist in humanitarian response and mental health and psychosocial support practice. For example, collaboration with local stakeholders is sometimes lacking. A 2014 review of guideline implementation attempted to answer challenges and resulted in several recommendations to improve practice and integration of the mental health and psychosocial support response in the humanitarian response including 'do no harm' (Anderson, 1999). This is translated by the IASC Working Group as Do NOTs:

- do not come in with predesigned, culturally-uninformed agendas and programmes
- do not ignore existing government and non-government actors and systems
- do not ignore local capacity and experience
- do not parachute in with short-term interventions
- do not attempt to provide support that one is not qualified to do.

It is recommended not to create stand-alone programmes that overload staff and resources from existing services and that cannot be integrated and sustained, nor to create unrealistic expectations, or focus on individuals rather than on the community as a whole. A good-practice perspective does not regard affected people as victims but sees them as capable people with resources (Wessells, 2009). Importantly, psychosocial support can equally promote mitigation of risk and disaster preparedness, thereby increasing pre- and post-crisis resilience in individuals and communities.

Psychosocial support integrated with disaster risk reduction

Psychosocial support interventions in disaster risk reduction can facilitate community networks, contribute to mapping strengths and vulnerabilities, and promote capacity-building of local populations (e.g., promotion of effective coping and community solidarity), including that of staff and volunteers needed for future response. An example of disaster preparedness and psychosocial support is given by the Australian Red Cross. Australia is susceptible to multiple hazards such as drought, flooding, earthquakes and pandemics. Instead of discussing how to prepare for each of these different hazards, the Australian Red Cross (2015), in what they refer to as, 'RediPlan', has focused on a multi-hazard approach by preparing communities to be better able to face any emergency. In the Emergency RediPlan which is a national community engagement programme, the focus is on the resilience of households and neighbourhoods towards managing health, financial and material impacts of disasters. It looks at physical and psychological preparation for impacts, discusses anticipation of reactions, and ways of managing them. Children in the age group of 8 to 10 are covered under the related Pillowcase Project, which provides them each with a pillowcase to take home for preparing an emergency kit. The preparation of the kits also helps the children mentally prepare for the anticipated emergencies. The project has involved 3,500 students in 50 schools across the country.

There is a positive synergy in integrating psychosocial support and disaster risk reduction to increase effectiveness and strengthen resilience in a population. In Indonesia, UNICEF (2008) has used activities such as village mapping to help children familiarize themselves with their surroundings, and in the process they have become more observant as well as feeling secure. Similarly, Save the Children International is using a child-centred approach for its Child Resilience Project in Bangladesh, reaching out to more than 14,000 individuals and their communities. Expressing thoughts and opinions, and engaging in dialogue and decision-making have been the major achievements of the children (Sterrett, 2016).

Preparing individuals and families psychologically to cope with crises increases their sense of agency and efficacy and may influence communities to invest more in mitigation and disaster preparation. Improving community connectedness can promote more inclusion of at-risk groups pre-crisis, and increase knowledge of local healing rituals and adaptive coping methods. Similarly, working on psychosocial guidelines in disaster risk reduction can foster the development of local or national-level psychosocial policies prior to emergencies and facilitate inclusion of psychosocial support in contingency planning.

Psychosocial support in disaster response

Psychosocial support guidelines mainly focus on the disaster response phase of the disaster cycle by setting out minimum standards and good practice in response (OPSIC, 2015). Psychosocial support can be integrated into food distribution, shelter, water and sanitation, and protection responses (see IASC guidelines). For example, psychosocial support workers can link with shelter response to increase efforts not to interfere with existing social networks and communities in shelter programme activities. Psychosocial support is typically integrated into other programmes that address needs, such as health care, tracing displaced people or legal aid. The Red Cross response to the 2010 Haiti earthquake provides an example of a major integrated psychosocial support response, where psychosocial delegates were deployed for the first time, working alongside medical staff in two mobile hospitals. Besides providing emotional support to patients, they also carried out awareness-raising activities and established a protocol for protection and care of unaccompanied children. This integrated approach reached out with adaptive and resilience responses in the community, and created a foundation for a long-term, community-based psychosocial support programme (IFRC PS Centre, 2014).

Psychosocial activities in disaster response can include psychological first aid, lay counselling, peer support, support groups, life-skill training, psycho-education, advocacy, recreational and creative activities. A common psychosocial support intervention after a disaster is psychological first aid, which is explored in Box 5.2 below. The aim is to assist persons to take care of themselves and regain their capacity to think clearly.

BOX 5.2 Psychological first aid: building resilience for crisis-affected communities

Psychological first aid (PFA) describes “a humane, supportive and practical response to a fellow human being who is suffering [in the immediate aftermath of exposure to serious stressors] and who may need support” (IASC, 2007, 119). In simple terms, PFA is an approach to offer emotional support to people in need. It involves looking for signs of emotional distress, listening and offering empathy to the person, and helping them to connect or link to other social or material supports. PFA is often regarded as an alternative to psychological debriefing (Freeman et al., 2000) and is now the most recommended immediate psychosocial response for people experiencing distress following exposure to crisis – irrespective of whether that crisis is interpersonal, intrapersonal or in the context of a large humanitarian event (Sphere Project, 2011). PFA is not a clinical intervention, a technical treatment or therapeutic technique, although it may form part of good clinical care (WHO et al., 2011). Therefore, after basic orientation, PFA could safely be provided by health or mental health professionals as well as by non-professionals, such as lay helpers or community members.

Foundations of PFA

International consensus (Hobfoll et al., 2007) and evidence-informed reviews (Bisson and Lewis, 2009) established PFA as an approach to help crisis-affected people to feel safe, calm, connected to social supports, hopeful and having a sense of control over themselves and their situation. PFA could be described as a collection of supportive practices that, at a minimum, does not harm and, ideally, supports people's well-being and resilience after a crisis (Forbes et al., 2011). Some experts suggest PFA may also foster improved functioning, but there is insufficient research to confirm this (Fox et al., 2012).

The popularity of PFA in humanitarian response

The concept of PFA is not new; many guides and frameworks have long existed. PFA has grown enormously popular in humanitarian responses, particularly since the publication of the World Health Organization, War Trauma Foundation and World Vision International's (WHO et al., 2011) *Psychological First Aid: Guide for Field Workers*. PFA is now a cornerstone for psychosocial support in most humanitarian responses around the world (Shultz and Forbes, 2014).

Reasons for the proliferation of PFA in humanitarian mental health and psychosocial support responses have not been formally documented. Its simple, common-sense, step-by-step approach enables those trained to feel more in control of how to work with distressed survivors (Schafer et al., 2015). Its wide availability and easy adaptation to gender, age, language, culture and context are all likely reasons for its success (Shultz and Forbes, 2014). Further, PFA may be perceived as an 'all-rounder' model. It is linked to doing no harm, reducing distress, increasing social support, facilitating positive coping, caring for the most vulnerable, building community and improving prospects for post-crisis resilience; although, in reality, PFA is unlikely to result in all of these outcomes in substantive ways.

The *IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings* (IASC, 2007) do not suggest PFA be implemented as its own psychosocial support programme. Instead, it is recommended as a first-line response and ought to be just one component of a holistic mental health and psychosocial support infrastructure that offers comprehensive services and programmes necessary to meet the wide range of psychosocial needs in post-crisis situations.

What PFA actually provides individuals in the long-term warrants continued analysis (Schafer et al., 2015). However, material is emerging about how PFA has been used innovatively in a number of humanitarian contexts and is forming part of the necessary continuum of psychosocial support and care.

PFA as a gateway to a wider psychosocial support response

In World Vision's Gaza programmes, PFA has been utilized as a gateway for broader psychosocial support and resilience building. After the conflicts in 2008 and 2012, World Vision responded by means of a large-scale livelihoods restoration programme that integrated psychosocial support for girls, boys, women and men. PFA training was provided to all individuals who worked directly with project participants (e.g., agricultural extension workers, children's club facilitators), as well as to mothers and fathers who used PFA strategies to support their own families and children when they were distressed. This whole-of-family approach strengthened the resilience of project participants to cope in the short term, and potentially in future conflicts (Schafer et al., 2014).

The effectiveness of PFA training in Gaza was further demonstrated during and after the devastating 2014 conflict (Schafer et al., 2015). Three hundred previously-trained individuals were mobilized to offer PFA and basic psychosocial support to more than 13,400 households, reaching approximately 61,000 individuals. Qualitative analysis confirmed that PFA assisted individuals to feel safe, reduce their distress, help them remain calm, to support each other within their families and to feel a greater sense of control and hopefulness, despite their adverse circumstances. The feedback suggested that PFA was indeed offering its originally identified outcomes (Hobfoll et al., 2007). However, PFA was not viewed as the only psychosocial response or need. Specialist services and other practical, social, physical, financial, political and community needs were critically required; PFA was an important element in the system of care to meet psychosocial needs and supports.

PFA was also utilized in World Vision's 2014–2015 Sierra Leone Ebola response, using the PFA guide specifically created for Ebola epidemics (WHO et al., 2014). In World Vision's response, among other activities, PFA was identified as the first skill set necessary for World Vision's workers, e.g., community health workers, child protection staff, burial teams, teachers and faith leaders. The goal of PFA training was to assist staff in competently and safely supporting people in distress. In addition, PFA was used as an opening to encourage greater awareness for the complex psychosocial needs of affected communities. PFA training was followed up or combined with other psychosocial support initiatives, such as encouraging teachers to create psychosocial-friendly classrooms, helping child protection officers to examine wider protection needs of children living in alternative care, and working with the coordination mechanisms to document referral services and train staff on when and how to link with those services.

There are numerous examples of how PFA has been integrated with other programmes, including from World Vision and many other organizations. Despite long-term individual impacts of PFA needing further study, overall feedback is showing PFA to be contributing towards its intended short-term outcomes, and it appears to be an important aspect of supporting and building resilience in emergencies. While PFA cannot and should not be implemented as a stand-alone psychosocial programme, it does offer opportunities to engage with and advocate for stronger mental health and psychosocial support systems. PFA has helped build resilience, and will continue to do so, but only when it is appropriately used alongside holistic psychosocial support initiatives. ■

Psychosocial support in recovery and development programmes

In major disaster situations, the consequences produce secondary stressors (e.g., reconstruction, relocations) that negatively impact on populations (Lock et al., 2012) resulting in psychosocial reactions sometimes lasting many years in the recovery process (Ghuman et al., 2014). In one-off acute events, distress tends to lessen when danger has passed compared to when individuals experience prolonged situations such as conflict, where symptoms may persist for several years (ODI, 2015). Support for resilience and recovery is therefore an ongoing, long-term need (Hobfoll et al., 2011). Long-term psychosocial support programmes can address evolving needs to support communities and individuals, as demonstrated in New Zealand in 2010–2012 in the immediate response by New Zealand Red Cross (NZRC) to around 13,000 aftershocks following two major earthquakes that affected the Canterbury area during that time. Besides undertaking immediate response activities, NZRC extended psychosocial programmes throughout the recovery period, supporting community-led outreach to those impacted by the earthquakes but not needing clinical assistance. With a focus on long-term recovery, a smartphone app and website were developed to reach out to adolescents, based on tips gathered from the young people themselves or from others like them in other countries who had faced a similar situation. Physical community activities and linkages with sectors such as transport, wherein support to drivers and passengers in relocated communities was helpful, gave a long-term perspective to the programme (NZRC, undated).

Psychosocial support is also pertinent to extension from recovery to longer-term development programmes. Although there have been advances in consensus of good practice in psychosocial support throughout the disaster cycle, there continues to be a gap between good practice consensus and some activities in the field.

Present challenges in psychosocial support

Need for more adequately trained psychosocial support workers

Although the skill set of psychosocial support helpers, leaders and coordinators has developed so that competency in the field has increased, and models have been developed that elaborate expected skills sets (Cox and Danford, 2014), there continues to be areas that need capacity building because some regions lack trained staff and volunteers for psychosocial support interventions (Te Brake and Dücker, 2013). The IASC is currently examining how to improve surge capacity during major emergencies.

Challenges to the sustainability of psychosocial support interventions and programmes

Difficulties in implementing psychosocial support remain. Psychosocial support has less priority in disaster risk reduction, compared to other sectors that may be considered more ‘urgent’. Also, awareness of mental health and psychosocial support guidelines may be high at headquarters level but does not always result in effective practice and utilization (IASC, 2014) and there continues to be an inconsistency between major psychosocial support actors and local initiatives so that local resources are not supported or helped to become sustainable. Transitioning from a disaster response to sustainable development of psychosocial support is possible if the psychosocial support capacity in a system transfers into policy. Policy-level enablement, as discussed in Box 5.3 below, is the way forward for strengthening the linkage between health and resilience.

BOX 5.3 Health and the Sendai Framework

The *Sendai Framework* was one of three landmark UN agreements of 2015 critical to the issue of health and resilience. This framework represents a step in the direction of global policy coherence with specific reference to health, economic development and climate change. The multiple efforts of the health sector in the policy development process, including campaigning for safe schools and hospitals, helped to put people’s mental and physical health, resilience and well-being higher up the disaster risk reduction agenda compared with its predecessor, the 2005 *Hyogo Framework for Action* (HFA) (Aitsi-Selmi and Murray, 2015).

The importance of health resilience is strongly promoted throughout the *Sendai Framework*. Most importantly, the framework aims to achieve the following outcome over the next 15 years: “the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries” (UNISDR, 2016).

To have health identified so clearly in this top-level goal is an important development from HFA. Indeed, the *Sendai Framework* seeks to build on elements that ensure continuity with the work already undertaken by UN Member States and other stakeholders and also introduces a number of innovations, with a strong emphasis on disaster risk management as opposed to disaster management. It has also identified seven global targets – four of these are essential for addressing health issues under the framework. These targets are:

- (a) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005–2015
- (b) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015
- (d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030
- (g) Substantially increase the availability of and access to multi-hazard early-warning systems and disaster risk information and assessments to people by 2030.

The recognition of mortality and morbidity as essential measures of impact has shifted the focus to disaster risk reduction for health and well-being delivery, as well as ensuring infrastructure for health facilities. The scope of disaster risk reduction has been broadened significantly to focus on both natural and man-made hazards and related environmental, technological and biological hazards and risks and can now be related to all hazards (UNISDR, 2015, paragraph 24 j). The role of health and resilience has thus widened considerably, making the call for multi-hazard early warning very important.

Within the Sendai Framework are important health-specific messages of real value to its implementation. These are listed below:

- 30 (i) Enhance the resilience of national health systems, including by integrating disaster risk management into primary, secondary and tertiary health care, especially at the local level; developing the capacity of health workers in understanding disaster risk and applying and implementing disaster risk reduction approaches in health work; as well as in the implementation of the International Health Regulations (2005) of the World Health Organization
- 30 (k) People with life-threatening and chronic disease, due to their particular needs, should be included in the design of policies and plans to manage their risks before, during and after disasters, including having access to life-saving services
- 31 (e) Enhance cooperation between health authorities and other relevant stakeholders to strengthen country capacity for disaster risk management for health, the implementation of the International Health Regulations (2005) and the building of resilient health systems
- 33 (c) Promote the resilience of new and existing critical infrastructure, including water, transportation and telecommunications infrastructure, educational facilities, hospitals and other health facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide live-saving and essential services
- 33 (n) Establish a mechanism of case registry and a database of mortality caused by disaster in order to improve the prevention of morbidity and mortality
- 33 (o) Enhance recovery schemes to provide psychosocial support and mental health services for all people in need.

Resilience is also critical to health in implementing the *Sendai Framework*. An International Conference on the Implementation of the Health Aspects of the Sendai Framework for Disaster Risk Reduction 2015–2030 was held on 10–11 March 2016, in Bangkok, Thailand. The outcomes of this meeting recommended in its Bangkok Principles (UNISDR, 2016) the following measures that could assist countries in implementing the health and resilience aspects of the *Sendai Framework*:

- promoting systematic integration of health into national and sub-national disaster risk reduction policies and plans and the inclusion of emergency and disaster risk management programmes in national and sub-national health strategies
- enhancing cooperation between health authorities and other relevant stakeholders to strengthen country capacity for disaster risk management for health, the implementation of the International Health Regulations (2005) and building of resilient health systems
- stimulate people-centred public and private investment in emergency and disaster risk reduction, including in health facilities and infrastructure. Here, the key actions identified include enhancing the safety, functionality and resilience of critical health infrastructure, and applying the principles of ‘building back better’ in recovery and reconstruction.

The four other recommendations from the Bangkok meeting endorse calls for disaster risk reduction into health education and training and to strengthen capacity building of health workers in disaster risk reduction; incorporating disaster-related mortality, morbidity and disability data into multi-hazards early-warning systems, health indicators and national risk assessments; advocating for, and supporting cross-sectoral, trans-boundary collaboration including information sharing, and science and technology for all hazards, including biological hazards; and promoting coherence and further development of local and national policies and strategies, legal frameworks, regulations, and institutional arrangements.

The *Sendai Framework* requires coordinated action for health and resilience across local, national, regional and international levels. Synergies across disaster risk reduction, the sustainable development goals and climate change policy have been identified but require more clarity and recognition. This could considerably enhance management of disaster risks through capacity development and joint policy initiatives between the health sector and other sectors. ■

Also, more clarity is needed in how mental health and psychosocial support can be integrated into the cluster system operating in times of emergency (including local representation), or be included in longer-term funding streams. Until recently, psychosocial support programmes, have not had high visibility in ongoing funding decisions. Clearer communication on how psychosocial support can be effective in ongoing development activities post-crisis and preparation for future emergencies would improve access to funding.

Need for more evidence-based research on psychosocial support interventions

If psychosocial support programmes are to demonstrate building resilience in a population, there is a need for further evidence-based research on psychosocial support activities (Blanchet et al., 2015). There is a scarcity of studies that assess needs and resilience processes, such as effective coping by displaced populations who are from diverse cultures. Equally, less is known about psychosocial support interventions and their long-term effect on populations and communities – both areas require further research. However, existing research (Eiling et al., 2014) has demonstrated the positive effect of psychosocial support interventions, such as child-friendly spaces (Lilley et al., 2014). One possible way to increase the evidence base would be to integrate research into the monitoring and evaluation of programmes. Effective monitoring and evaluation includes clear indicators and can provide information on outcomes and relevance of the activities.

Need for stronger assessment, monitoring and evaluation

Although understanding and systematically incorporating the local community is accepted as good practice in assessment and implementation, this is not always systematically undertaken (Cohen and Asgary, 2016). In addition, community consultation needs to take into account diversity within the community because in some cases minority voices may be silent and services maybe be needed even when recipients of assistance do not feel able to ask for them (Mansuri and Rao, 2013). There is a continuing need to improve coordination of assessment in major emergencies. Multiple assessments of the same community by different actors, or partial or inadequate assessments, still occur in practice. The IASC has suggested that providing a focal point for mental health and psychosocial support during all large-scale emergencies could improve coordination mechanisms for assessment and implementation.

Most reviews of psychosocial support interventions point out the need for robust monitoring and evaluation, which to date has been lacking in many programmes. Effective monitoring and evaluation can provide information on relevance of the activities and the evolving needs of the affected community, as well as establish accountability. The existing gap in monitoring and evaluation should be reduced by the new tools being tested during 2016 by the IFRC PS Centre and the upcoming IASC mental health and psychosocial support Reference Group release of a field version of a common monitoring and evaluation framework for such programmes.

Although still existent, the challenges in providing psychosocial support are being addressed. Often disaster situations are complex contexts and the need for psychosocial support, as seen in the following examples, can be integrated into multiple crisis situations. These examples illustrate how psychosocial support can enhance humanitarian response and longer-term development programmes.

Examples of how psychosocial support translates into building resilience

Psychosocial support interventions in times of crisis can be incorporated into multiple sectors of assistance so as to relieve suffering and build resilience. Such interventions during terrorism also benefit from both immediate and long-term design. “Strengthening Resilience: a global selection of psychosocial interventions” (pscentre.org) provides a number of relevant examples.

Following the mass killings and bomb attacks in Norway in July 2011, the Norwegian Red Cross reached out to the affected persons through its centres across the country since the youth targeted at the camp were from different places of origin. A national support group was established to provide long-term support to the affected persons, which went on to recruit more than 1,000 members organized in 17 local branches.

Emergencies, including disasters, conflicts and forced migration, are projected to remain a constant context for the humanitarian response. The IFRC policy on migration adopts an approach of immediate action with longer-term assistance and empowerment. Psychosocial support interventions can ease difficulties and foster resilience processes during forced migration situations. The Syrian Arab Red Crescent established 33 mobile psychosocial support teams, including 10 counselling centres and four multidisciplinary units across the country in response to the support needed by people displaced as a result of the conflict in Syria in 2013. This initiative helped reduce daily stressors among families in shelters, and assisted in orienting them to their present circumstances and moving towards adaptation.

An example of building psychosocial support in health care, violence protection, well-being and resilience processes emerges from the Maelis Centre, established by Cambodian Red Cross in partnership with French Red Cross in 2010. The psychosocial support centre caters to children living with HIV and AIDS in Cambodia, by liaising with health clinics and schools, as well as protecting children’s rights through their integration within their community and the obtaining of identity papers. This programme has transitioned from being an urgent response to children accessing necessary health care towards becoming a more global development programme that increases resilience and decreases risk in relation to future events in this vulnerable section of the community.

As is evident from these examples, contexts are key determinants of needs and resilience approaches. Often vulnerabilities are worsened, as in the case of persons with disabilities living in small-island societies, which is discussed in Box 5.4.

BOX 5.4 Disability and small islands: learning from the Maldives

Recent disability prevalence rates show that 8.1 per cent of the Maldives population has either temporary or permanent disabilities (HRCM, 2010). According to the preliminary report of the Disability Screening Survey undertaken by Handicap International in 2009, about 4.7 per cent were found to have severe permanent functional limitations or disabilities. In those islands where all the households were screened, the prevalence rates varied between 9.0 and 11.8 per cent. However, rehabilitation services for persons living with disabilities (PWDs) is still a developing area in the Maldives.

In December 2004, the Maldives was affected by the Indian Ocean tsunami. While the death toll was fewer than 100, the impact was still dramatic: 25 per cent of inhabited islands were severely damaged or destroyed; 10 per cent were totally destroyed; 14 islands had to be evacuated; total losses were estimated at US\$ 472 million, which equated to 62 per cent of gross domestic product (Care Society and Mercy Malaysia, 2010).

With limited available resources, the whole psychosocial community (counsellors, social workers, psychologists) working in different organizations joined hands to provide support for families who were affected at island level. Task groups were formed where different groups were sent off to different islands to determine the psychosocial support needed by the affected populations. However, anecdotal evidence suggests that vulnerable groups were subjected to greater hardship than others in this operation. Reported incidents include physical violence, discrimination and sexual abuse.

In 2007, the Maldives established Family and Children Service Centres in all its 20 atolls, or island groups, with the aim of focusing on children's needs in particular, as well as families' as a whole. The Ministry of Law and Gender is the monitoring body for the work undertaken by these centres. Home visits are conducted by the social workers from these centres on a case-by-case basis and provide the needed psychosocial support to the families.

The Maldives Red Crescent has established its teams in 10 islands across the country and they provide psychosocial support trainings, with Care Society, a national NGO, coordinating training support related to disability from a perspective of disaster risk reduction.

Teachers who are concerned about the mental well-being of a child with a disability or the overall psychological mindset of the parent, are faced with challenges at school that became very evident in the aftermath of the Indian Ocean tsunami of 2004. Since the centres are located on just one island, although psychosocial support is needed in each island, it has been a growing concern for the service providers as well. The procedures involved and the time taken to make inter-atoll trips are too long according to the service providers, thus discouraging potential assistance seekers. It is clear that such challenges become more acute in the times of impending disasters when warnings have been issued, or in the immediate aftermath of a disaster.

The island councils, being the main government authority to provide services to the people in the islands, lack the needed capacity to extend support services for disaster risk reduction to PWDs. There is no existing data or registry of the number of PWDs living on each island. This makes it even harder to reach out to them. Absence of a proper networking system results in making referrals difficult whenever they are needed. However, with these challenges the councils reach out to the service centres mentioned above, as well as to the police stations, in seeking the support needed for PWDs.

In 2015, in an evaluation undertaken by Care Society in five islands, it was found that there was a lack of proper psychosocial support provided for the PWDs when in need (Care Society, 2015). This also highlights that proper training is required and adequate staff support provided to the service centres to enable them to deliver effective and high-quality services.

In recent years, private institutes have started to provide mental health-related services to the community. This has been an added advantage for the civil society organizations working with PWDs in this regard. Care Society is one organization that has partnered with one of the institutes (Institute of Counselling and Psychotherapy – ICP) to provide mental health services at an affordable cost for PWDs. However, these services are centralized in the capital city of Malé and most of the PWDs live in the island communities. Therefore, PWDs have very limited access to such services. Even a minor psychological evaluation requires a trip to Malé, incurring costs from approximately MVR 1,000 (US\$ 65) to MVR 5,000 (US\$ 324.20) if availing of private services.

These facts suggest that local provision of psychosocial support, both for building resilience and addressing recovery needs, may be the best solution. Given current levels of development in the psychosocial care sector, as well as in telemedicine, these services can be made available through improvements in the current systems and by strategic outreach mechanisms targeted at the most remote locations and communities living therein.

A strong policy environment, supported by an implementation and enforcement regime, is a primary requirement, to be followed with capacity building initiatives to create and retain a small group of trained and certified professionals. In a small-island context such as the Maldives, island councils need to give attention to developing sufficient awareness, training and resource allocation in order to deal with the issue of PWDs and disasters. ■

The synergy of psychosocial intervention and conflict reduction produces a stronger impact. There is a connection between creating a culture of non-violence, and individual and community well-being that can be of benefit before, during, and post-crisis. Programmes such as Youth as Agents of Behavioural Change (YABC), the IFRC initiative, incorporates psychosocial support to promote a culture of non-violence and peace in a context of chronic occupation and conflict. It promotes ethical leadership roles for the youth, with a focus on peace alternatives in a context of conflict. Peer educators are trained, and the youth are encouraged to act as change agents bringing positivity in their communities. A global impact study of the YABC programme in 2008–2012 reported achievement of behavioural change. The programme had reached an estimated 120,000 people by 2012 (IFRC PS Centre, 2014).

In another example, the Green Jobs Initiative of Samoa Red Cross Society (SRCS) shows that local youth are being made aware of climate-change adaptation in helping society become more resilient; at the same time, it addresses unemployment issues. In this way, they can become confident and mentally stronger, and it also ensures their financial and overall well-being. Over the past few decades, Samoa has suffered major damage from cyclones in 1990–1991 and 2004, and a tsunami in 2009. Changes in the scale and impact of these types of natural hazards are likely to be important consequences of climate change and sea-level rise for the country. In 2015, SRCS, together with the Ministry of Women, Community and Social Development and the International Labour Organization (ILO), formed a partnership in engaging and providing enabling space for young volunteers to start a project to address critical issues that the country now faces, i.e., youth unemployment and climate-change adaptation. The project is called ‘Green Jobs’, the project name itself reflecting its aim. It aimed to restore and protect the productive capacity of lands, to build resilient infrastructure capable of adapting to climate change and reducing impacts of natural hazards, and to create livelihood and income security for the most vulnerable. The youth were the front-line mobilizers in working on cleaning the rivers and fixing tsunami-awareness signboards along roadsides.

As the above examples illustrate, there is no single type of effective resilience-promoting intervention following adversity (ODI, 2015), but the strongest psychosocial interventions address developing psychosocial support skills, support key individual and community relationships in a culturally and contextually appropriate form, and enable access to livelihood, health and education. Resilience processes in individuals and communities are supported and facilitated.

Local actors and their organizations are often both front-line implementers in the field and those that undertake the most exposed roles in crises. Here, the Syrian Arab Red Crescent runs a psychosocial programme for children affected by the conflict in their country.
© Afaf Mirzo/Syrian Arab Red Crescent



Conclusion

When effective, psychosocial interventions can provide genuine benefits to crises-affected populations. Psychosocial support programmes can be integrated into multiple situations and throughout all stages of the disaster response cycle (from relief and recovery through to mitigation and preparedness). Challenges remain, however. Work is needed to ensure that these interventions are incorporated into relevant sectors and to transition from response activities to all phases of disaster management. In some regions, increased collaboration with local entities, including integration of innovative local, culturally-framed resilience processes, is still necessary. However, with the growing interest in understanding quality in psychosocial interventions, the availability of guidelines, and recent monitoring and evaluation tools, empirical reports suggest that the number of inappropriate or harmful interventions will lessen.

The synergy that psychosocial support can have with disaster risk reduction in building resilience is not in question. Psychosocial activities can build and sustain resilience processes in individuals and communities facing risk. Good practice and effective psychosocial support within the disaster cycle aims not to replace local resources but to promote and support local initiatives and structures, collaborating with them in assessment, implementation and evaluation, within a culturally-appropriate approach. This will enable psychosocial support programmes to be in line with locally-expressed needs and priorities as well as to foster local management capacity for quality and sustainability.

Chapter 5 was written by Maureen Mooney, PhD, Research Scholar, Massey University, New Zealand. Box 5.1 was written by Mark Harvey, CEO, Resurgence, London, UK; Box 5.2 by Alison Schafer, Technical Specialist Mental Health and Psychosocial Support, World Vision International, Victoria, Australia; Box 5.3 by Virginia Murray, Vice-chair, UNISDR Science and Technical Advisory Group, London, UK; and Box 5.4 by Naushan Muhaimin, Executive Director, Care Society, the Maldives. The case of the Green Jobs Initiative in Samoa was contributed by Samoa Red Cross Society.

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Stronger together: partnerships that build resilience

“If you want to go fast, go alone. If you want to go far, go together”

African proverb

Disasters can shake the very foundations of a society and community, forcing them to take stock of their level of exposure and their vulnerabilities. As many disasters have shown, for instance in the wildfires that engulfed the Canadian town of Fort McMurray in May 2016, a well-coordinated, collaborative disaster response is central to not only saving lives but also post-disaster recovery and reconstruction. Almost 90,000 individuals were evacuated safely from the town, into various campsites or to other urban centres, with only two lives lost (from related road accidents, not the fire itself) (Guardian [The], 2016). The coordination between emergency response services, national, provincial and local governments, NGOs, the Canadian Red Cross, local community groups, and the private sector (Fort Mac, as it is colloquially known, is a big centre of the Canadian oil sands industry) appears to have been exemplary in the initial response phase.

Also in May 2016, a severe tropical storm in Sri Lanka forced more than half a million people to flee their homes after heavy rains and flash floods hit the country, affecting 22 of 25 districts (OCHA, 2016). Recognizing the concerted effort needed from all stakeholders, the President of Sri Lanka called on “private individuals, companies and non-governmental organizations to help in any way you can to help the victims” (ABC News, 2016).

In these examples, and elsewhere, the role of collaborative efforts – either through working together informally, or through more formalized arrangements such as partnerships – has emerged as a critical element supporting the resilience of communities. This is particularly important in towns and cities, now home to more than half of humanity and set to grow, where there is a concentration of people, services, a wide range of economic activities, multiple institutions, and a mix of governmental and non-governmental actors. In such areas, working together is not an option but a necessity, and finding the most effective mechanisms for this to occur, the challenge.

Red Cross volunteers work with members of a community to conduct an assessment on their vulnerabilities and existing capacities in terms of disasters, health promotion and livelihoods. The exercise is a part of the community-based health and first aid approach (CBHFA).
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Defining partnership

As with so many terms used in the aid sector, there are many different definitions of partnership. Those most commonly in use bring to mind values such as mutual respect, trust and shared commitment; e.g., the Global Humanitarian Platform's Principles of Partnership (2006) – to which a number of UN agencies and NGOs have signed up – comprise equity (mutual respect), transparency (dialogue), a results-oriented approach, responsibility (meaning competence) and complementarity (utilizing each other's comparative advantage).

Similarly, a recent conceptualization by the Partnering Initiative (a not-for-profit organization “dedicated to unleashing the power of partnership”) defines partnership as a “collaboration in which organizations work together in a transparent, equitable and mutually beneficial way towards a sustainable development goal and where those defined as partners agree to commit resources and share the risks as well as the benefits associated with the partnership” (FHI, 2011).

Partnerships in global policy-making

Partnerships are often at the core of collaborative efforts. The IFRC's One Billion Coalition for Resilience (2015), for instance, acknowledges that “the key to realizing the Coalition is to mobilize a broad partnership of actors from local to global, committed to the common cause of building resilience at the individual or community level”.

Globally, the processes involved in reaching a range of recent global agreements – such as the *Sendai Framework*, the *2030 Agenda for Sustainable Development*, the *Paris Agreement on Climate Change*, *The Grand Bargain* from the World Humanitarian Summit (WHS) or the *New Urban Agenda* from Habitat III – have all demonstrated the importance of collaborating with a wide variety of actors (as one example, the WHS regional consultations over a two-year period are thought to have engaged with some 23,000 stakeholders from all sectors of society). Constituencies that may have been unwilling to trust each other previously – e.g., local and national governments; local governments and grass-roots or civil society more generally; or, business/industry and grass-roots trade unions and workers – are coming together to advance common goals. The final agreements adopted at these events reflect this emphasis on collaborative action as well.

The *Sendai Framework*, adopted in March 2015 as the successor to the *Hyogo Framework for Action* (HFA), clearly emphasizes the importance of partnerships in at least four of its 13 guiding principles, aimed at “an all-of-society engagement” (UNISDR, 2015), which is discussed in Box 6.1.

BOX 6.1 'All-of-society' engagement through networks

The process to strengthen resilience starts at the local level with an understanding of risks, needs and priorities from the perspective of the primary risk-bearers i.e., affected populations. In the words of Ban Ki-moon, "Any effort to reduce vulnerability of people and strengthen their resilience must begin at the local level" (UN, 2016a).

Such an approach requires *all-of-society* engagement and multi-stakeholder partnership involving a more robust participation of vulnerable people in political and governance processes. Strengthening collaboration and inclusion are essential for the effective use of existing capacities. While states have the overall responsibility for people's safety and protection, it is a shared responsibility between governments and relevant stakeholders. Enhanced multi-stakeholder participation will require a more holistic way of thinking about the interconnected nature of different risks and the fundamental relationships between development and disasters, resilience and sustainability and their associated actors. It will also require a deeper understanding about how change occurs in complex societies; reforms in state institutions and public policies are insufficient on their own to strengthen the resilience of nations and communities unless these reforms co-evolve with 'cultural' changes in societal and individual norms, values and behaviours.

In support of these changes, civil society has unique and diverse roles to play. Civil society's strength comes from the diversity of perspectives, capacities and creativity of a wide range of formal and informal actors, organizations and associations operating from the local to the national, regional and international levels. At the local level, civil society has a well-developed understanding of the cultural context based on established relationships and experience of working with disaster-affected populations. Civil society can support local authorities to reach out, empower and facilitate the engagement of at-risk people, particularly marginalized and socially-excluded groups that are disproportionately affected by disasters. In addition, civil society has substantially lower overhead costs than intergovernmental bodies and can mobilize local resources and social capital, share information and good practices that can drive innovation, and can improve the quality and quantity of development actions, particularly in situations of fragility and insecurity where the state is absent or dysfunctional.

At the national level, civil society can enhance citizen representation in the formulation and implementation of relevant public policies, leading to more effective interventions that better reflect people's realities and priorities. Civil society has the ability to work across institutional divisions and fragmented policy silos to improve coherence and mutual dependence across disasters, development, climate and security agendas, essential in making a difference at the community level. Importantly, as independent development actors, civil society can advocate and enhance political ownership for policy implementation by strengthening domestic transparency and accountability. This involves the sharing of information to raise public awareness, as well as improved monitoring of the implementation of laws and policies. Together, these actions can serve to increase the state's legitimacy to its citizens leading to increased inclusion, connectivity, responsiveness, diversity, learning, equity and social cohesion – core principles which lie at the heart of efforts to reduce societal fragility and enhance resilience.

Yet, despite widespread recognition that strengthening resilience requires greater cooperation and partnership between state and non-state actors, the relationship between governments, civil society and the broader collective citizenship is often delicate. In many contexts, local and national civil society actors face limitations on the ability to raise resources and restrictions on the meaningful participation in domestic policies. Also, civil society itself faces challenges of representativeness, transparency, internal governance and capacities. Organizations are competing for adequate and predictable long-term financial resources made worse by the economic crisis, tending to work in a fragmented manner with weak collaboration amongst civil society and poor connectivity with other stakeholder groups.

In recognition of these challenges – although bound by a shared belief in the value of a vibrant, active and collaborative civil society in supporting people and their communities – civil society networks, associations and umbrella organizations can provide an important means to develop an enhanced and more strategic approach to strengthen the engagement of citizens with their governments at all levels. By strengthening collaborative capabilities, enhanced the sharing and co-creation of knowledge and good practice, and a commitment to undertake joint actions, global networks (such as the Global Network of Civil Society Organizations for Disaster Reduction) can play an important role in unlocking the potential of civil society and supporting a more meaningful participation of at-risk populations in the development and formulation of public policies and plans to strengthen resilience from local to global levels. Encouragingly, the role of non-state stakeholders in the 2030 development agenda (including the *Sendai Framework*) is significantly more prominent than in previous frameworks. The challenge, as always, lies in being able to convert these high-level policy aspirations into local practice at the grass-roots level. ■

Partnerships and coalitions are increasingly being seen as key to advocacy, knowledge creation, design and implementation of programmes on the ground, as well as to monitoring and review. Such initiatives can be seen in regard to building resilience. The One Billion Coalition for Resilience (IFRC, 2015) has among its stated aims the promotion of local organizations, so that “they are treated as primary and equal partners in today’s humanitarian systems”, and creating conditions for “like-minded organizations and solution-providers to avoid working in fragmented and disjointed ways”. It believes that: “From local to global, partners will grow stronger if they agree to share ambitions, risks, resources, capabilities, successes and accountability”.

Another bold initiative led by the United States Agency for International Development (USAID) with the Rockefeller Foundation is the US\$ 100 million Global Resilience Partnership in Africa and Asia. Launched in 2014, the initiative aims at “solving the complex and interrelated challenges of the 21st century such as persistent and often extreme poverty, food insecurity, and climate shocks”. To achieve this, a strong emphasis is being placed on ‘connecting’ civil society with government and the private sector. The Resilience Partnership is structured at three levels: globally, comprising the donors (USAID, Rockefeller Foundation and the Swedish governmental donor SIDA); regionally, where a partner catalyses relationships between different actors; and locally, where the aim is to “motivate local and regional institutions, the private sector, development agencies,

humanitarian organizations” (Global Resilience Partnership, 2016). The private sector has emerged as a key player, and the *Sendai Framework* has accorded a significant role to it also, opening doors for this partnership to be able to play an increasing role in building resilience (see Box 6.2 below).

The Rockefeller Foundation has also championed the *100 Resilient Cities* initiative (described in Chapter 1), aimed at improving urban resilience in 100 cities across the world through collaborative actions (also) catalysed by means of having a Chief Resilience Officer in each city. Collaborative efforts to build resilience are becoming even more important due to the increasing pace and scale of urbanization. In contrast to rural areas, urban centres are characterized by high levels of population density and diversity, and a wide array of stakeholders. In such environments, international humanitarian actors find themselves ill-equipped to deal with the complexities of urban crises. Without partnerships and other forms of collaboration that involve local policy-makers, service providers, professionals, communities and businesses, the impact of humanitarian interventions in urban settings risks being short-lived, piecemeal, sporadic and ultimately unsustainable.

Recognizing this need, the Global Alliance on Urban Crises was launched at the World Humanitarian Summit to work in a collaborative way in urban settings, involving both humanitarian and development actors. ‘The Alliance’ has been positioned as a global, multidisciplinary and collaborative community of practice, a ‘network of networks’, working to prevent, prepare for and respond to humanitarian crises in urban settings in effective ways. Over the next few years, it will attempt to build up knowledge, as well as develop innovative field-based solutions, through collaborative actions involving local authorities, national and international NGOs, UN agencies, professional associations and civil society organizations that make up its membership.

BOX 6.2 Not ‘business as usual’ – the need for better private sector partnerships

While there is recognition that the private sector is an important partner in the field of humanitarian action, private sector partnerships have largely been short term and ad hoc, oriented towards emergency response and led by aid agencies seeking to draw on financial support from large companies to assist in their work. Private sector motives for working in this field have also been treated with some suspicion by aid agency personnel. In recent years, however, there have been changes in the nature of private sector partnerships in humanitarian action. Three key cross-cutting trends can be observed: firstly, a move away from focusing simply on the cash resources that the private sector can provide; secondly, an acknowledgement that relationships with the private sector can comprise a diverse range of actors; and thirdly, acceptance that the private sector (in its various forms) has a role to play, not just in emergency response but also in disaster preparedness and the building of resilience.

In 2014, a report published by the Overseas Development Institute (ODI) noted that business’s largest contribution to humanitarian action came from sharing technological innovations in areas such as logistics, telecommunications and cash transfers (Zyck and Kent, 2014). Examples include: DHL’s

partnership with the UN Development Programme (UNDP) and the UN Office for the Coordination of Humanitarian Affairs (OCHA); TNT's collaboration with the World Food Programme (WFP); the Ericsson Response initiative with UN partners and others to establish mobile networks during relief efforts; and cash transfer collaborations such as that between The UN Refugee Agency (UNHCR) and the Cairo Amman Bank in Jordan using iris scanning technology to enable refugees to access funds.

The partnerships mentioned above have mainly been built with multinational companies. However, more diverse forms of private sector collaboration have emerged through relationships with national companies, micro, small and medium enterprises (MSMEs), social enterprises and business associations such as chambers of commerce. In Kenya, the mobile phone company Safaricom's M-Pesa initiative assisted the transfer of money for those without a bank account during post-election violence in 2007. Partnerships have also been established between NGOs and MSMEs to assist in food distribution through connections with suppliers in Kenya and Pakistan (Zyck and Kent, 2014). In the Philippines, the *Agenda and Platform for Poverty Reduction and Addressing Inequality through Social Enterprise to Enhance Reconstruction Assistance on Yolanda* (APPRAISE RAY) initiative was set up to develop a rehabilitation agenda with the social enterprise sector following Typhoon Yolanda in 2014 (ISEA, 2014). Meanwhile, chambers of commerce have played important roles in getting businesses back on track through partnerships with aid agencies after a range of emergencies and disasters (ICC, undated).

Private-sector partners are also engaging with a more diverse mix of actors. Beyond bilateral links to humanitarian agencies, we are now seeing collaborations that include government bodies, academic institutions, professional associations, foundations and scientific organizations. An example of this is the partnership facilitated by the Innovation and Technology for Development Centre at the Technical University of Madrid to develop sustainable solutions for access to energy in humanitarian crises. Currently being piloted with UNHCR at the Shire refugee camps in Ethiopia, the partners include Iberdrola, Philips, ACCIONA Microenergía Foundation (known locally as FUNDAME) and the Spanish Agency for International Cooperation and Development.

Working with a wider range of partners and resources is central to an acceptance of the capacity of the private sector to promote resilience. There is a growing understanding that by reinforcing local markets, business networks and supply chains, communities are more quickly able to have access to basic goods and services to overcome crisis situations. Partnerships that involve and promote MSMEs can also attract new investment to affected areas and encourage relocated populations to return home. These relationships require clear objectives and processes for working together, as well as commitment to more solid forms of collaboration to ensure sustainability.

The changes outlined above coincide with an increased emphasis on building more innovative partnerships with higher levels of ambition and the inclusion of a broader variety of different actors, including citizens themselves. This focus is central to both the *Sendai Framework* and the *2030 Agenda for Sustainable Development*. The agendas of both these initiatives stress the importance of people-centred approaches and the need for inclusive multi-actor partnerships to develop innovative, holistic and sustainable solutions to complex problems. Sometimes described as Public-Private-People Partnerships (Zhang and Kumaraswamy, 2012), early indicators suggest that private sector engagement in collaborative efforts to build resilience may be strengthened by:

- ensuring clarity around private sector incentives for partnering – concern about private sector engagement in partnership can better be addressed if there is clear understanding of the nature of private sector partners, their incentives for collaborating and the benefits that they hope to gain from these connections
- promoting holistic approaches – careful consideration of the relationship between private sector partners and their value chains, including employees, customers, suppliers and the communities in which they operate
- balancing innovation with accountability – providing space for private sector partners to promote innovative solutions while also ensuring clarity around partnership systems, structures, roles and responsibilities so that accountability to recipients of aid and governance systems is reinforced
- integrating innovations into structures and systems – working closely with the public sector to integrate new solutions and business models into disaster risk management systems with, where appropriate, private sector involvement in the development of normative frameworks and technical standards for this.

While private sector partnerships clearly have a role to play in building resilience and promoting sustainable development, it is important to acknowledge that they are not a cure-all. In order to fully understand their potential, more systematic ways of sharing and learning from experiences of working in this way are essential. Such opportunities should allow for reflection on what works and what does not, so that realistic assessments can be made about the suitability of private-sector partnership approaches for disaster risk reduction in particular contexts. ■

Partnerships – an abused word?

Commitment 2 of *The Grand Bargain* (the formal outcome of the WHS) commits its signatories to “engage with local and national responders in a spirit of partnership and aim to reinforce rather than replace local and national capacities” (UN, 2016, 5). This touches on what for many is a sore point about partnerships: that they do not always live up to the rhetoric, wherein the intentions of many partnerships – the term is intended to imply a relationship that has values, fairness, reciprocity and respect implied within its meaning – are not be realized in practice. This can occur when one partner (usually the larger and more powerful organization) who has the budget, works with a local partner, who gets less say (or no say at all) in how the budget is agreed, or even how the project purpose and activities are to be enacted. Funding transfers from the larger to the smaller organization will be accompanied with a contract, which will almost certainly spell out conditions that favour the funding partner.

A fairer and more accurate word for many such partnerships would be ‘contractor’. ODI’s *Time to let go* report, referred to in Chapter 1 as a particularly critical review of the state of the sector, identifies this imbalance as a factor that has a negative impact on performance, where “the relationships between donor and implementer, aid provider and recipient remain controlling and asymmetrical, and partnerships and interactions remain transactional and competitive, rather than reciprocal and collective” (Bennett, 2016, 5).

Another extensive study, *Time to listen: hearing people on the receiving end of international aid* (Anderson et al., 2012) – which interviewed over 6,000 people from across the world who have received international assistance on their experiences and opinions of aid – devotes a chapter of its final report to partnerships. The findings are sobering. The study found that, all too often, trust and respect between partners can diminish during emergencies. In critiquing unbalanced relationships, they found that, “at times, local organizations feel used by international NGOs when they are included in proposals in order to comply with donor requirements that local partners be involved. In some cases, local organizations have seen international NGOs effectively take over local initiatives” (Brown, 2011). They also found that “local organizations often feel that there is a lack of respect and appreciation for their knowledge and contributions, and that their partnerships are limited since they are rarely involved in decision-making processes with their partners”.

Other issues identified included a ‘paternalistic’ attitude from international agencies to local partners, that communities notice these poor relations playing out, and that “donors and international aid agencies are often concerned with delivering aid and spending money quickly, and in this haste they often do not spend enough time identifying good local partners and maintaining effective relationships with them”.

The study concluded that, while far from satisfactory, partnerships are essential: “In spite of all this, international aid providers should partner with local institutions anyway!” (Anderson et al., 2012, 93), identifying that key elements of effective partnerships are mutual understanding, trust and respect, and that “effective partnerships are about more than service delivery”.

An example of strained partnership relations is provided by the 2015 Nepal earthquakes. International NGOs are not allowed to directly be operational in Nepal, and so must work through local partners. In a six-month ‘response review’ (Sanderson et al., 2015) – undertaken for the UK and Canadian funders the Disasters Emergency Committee (DEC) and the Humanitarian Coalition (HC), respectively – of the response of their member NGOs (13 for DEC, five for HC), it was found that the sense of inequality was keenly felt by many local NGOs. This extended to the funding relationship in particular, where local NGOs were entirely dependent on their international NGO partner for support. Also, relief and recovery proposals were not always jointly developed

equally between international and local partners. To redress this, the response review recommended that decision-making should be more equal: “To contribute better to national and local NGO capacity, recovery plans must be jointly developed with NGO partners, wherein these partners have an equal stake in strategy, direction and final sign-off” (Sanderson et al., 2015, 20).

Figure 6.1 below illustrates the choices available for effective partnerships. By correlating ‘importance of relationship’ with ‘importance of achieving the goal’, the graph indicates that organizations have a choice on how to behave. Effective partnerships (where the relationship is valued and the goal is achieved) rely on achieving consensus.

FIGURE 6.1 Styles of negotiation



BOX 6.3 Waves of resilience in Mercedes

The town of Mercedes is located in the Bicol region, in the southernmost part of Luzon, Philippines. It consists of 26 barangays (the smallest administrative division), three of which are island communities while the rest are located along the coastline and mountains facing the Pacific Ocean.

Given the geographic location of the municipality, Mercedes is prone to different types of hazards, especially tsunamis, storm surges, typhoons, floods, earthquakes and landslides. Hence, the Center for Disaster Preparedness (CDP) forged a three-year project, from 2013–2016, with the Adventist Development and Relief Agency (ADRA) called Sustainable and Resilient Agribusiness Development in Mercedes (SARAM) aimed at enabling communities, especially the poor and marginalized, to mitigate disaster risks in the context of their livelihoods through livelihood programmes and Community Based Disaster Risk Reduction and Management (CBDRRM).

Economic resilience

With a population of just under 48,000 people, Mercedes’ economy thrives mainly through farming on large parcels of paddy lands and vegetable farm lots, and fishing from the San Miguel Bay leading to the Pacific Ocean. Given the primary livelihoods of the municipality (outlined below), the SARAM project focused on four project components.

One component is the System of Rice Intensification (SRI), which enabled rice farmers to improve their techniques in rice planting and harvesting. Veering away from traditional rice planting, SRI modernized the rice farmers' techniques, reducing water usage, increasing land productivity, and promoting the use of organic nutrients and fertilizers.

Fisherfolk were taught more sustainable and productive ways of fishing through the Fish Cage Farming component. In addition to the production of fish cages, fisherfolk were trained to evacuate cultures of fish to protected sanctuaries during the event of typhoons and other hydro-meteorological hazards.

Through the component Organic Vegetable Farming, men and women in the community were taught how to improve the productivity of their gardens through organic farming techniques. Supplied with multiple gardening tools, community members were taught good practices in developing their food sources.

The last component is CBDRRM through the skilled mentorship of CDP, whereby several sessions of training the trainers were conducted alongside learning visits in the various communities to help residents to prepare for, prevent and mitigate, and respond to the multiple hazards that afflict their municipality. Just before Typhoon Glenda struck in 2014, the people anticipated having to evacuate their organic products – the protection of livelihood is given prime importance within the community, and has been integrated in their early-warning systems.

Political resilience

Along with the endeavour to strengthen the economic state of the municipality, the political systems and structures for disaster risk reduction and management (DRRM) of Mercedes were also strengthened. The Municipal Disaster Risk Reduction and Management Council (MDRRMC), comprising department heads of the local government and local representatives of national agencies, was activated and has proactively engaged in vulnerability reduction and resilience building. Capacity-building activities and material equipping were carried out to provide an enabling environment for the local government to exercise effective and efficient DRRM governance. The MDRRMC played a fundamental role in institutionalizing a culture of preparedness and resilience, particularly at the local level. Equipped with knowledge and skills gained from multiple trainings, the MDRRMC became instrumental in educating the households of all the 26 barangays (districts). With the strategy of teaching at least one member of each household about CBDRRM, the municipality was able to instil among the barangays their significant role as 'front-liners', as well as the value of family preparedness.

Their level of preparedness was tested when Typhoon Glenda struck the municipality, for which the families anticipated when it was necessary to evacuate. To ensure a clear municipal DRRM agenda, the local government formulated DRRM and contingency plans that outline their priority activities for preparedness, prevention and mitigation, emergency response, rehabilitation and recovery. These plans, along with the early-warning system, were tested through a municipal-wide simulation exercise. In addition, to institutionalize DRRM in the development plans and programmes, the Mercedes DRR Climate-Change Adaptation (CCA) Code was passed by the municipal legislative body and is currently on its second reading. This code compiles the DRR and CCA-related laws and ordinances of Mercedes and serves as a mechanism to ensure that all current and future leaders of the municipality follow these legal instruments towards enabling safety and resilience.

Socio-cultural resilience

Above all else, the project developed and enhanced not only Mercedes' existing structures, plans and policies on livelihood and DRRM but also their frame of mind towards resilience building. Along with the various milestones that emerged throughout the project's implementation came a renewed sense of enlightenment and understanding on how participants can better prepare for the threat of natural and human-induced hazards. Though this undertaking focused mainly on livelihood sustainability and business development, the greatest testament to its success was the social transformation that occurred across all levels of engagement – from the community to the provincial level – which proved the efficacy of the inclusive community-based approach in DRRM. Community members and local authorities both gained more knowledge and insight on disaster preparedness, enabling them to become more active players in the crusade towards establishing community resilience.

Essentially, it was the strong partnership forged by the government, civil society, academia and the private sector that helped foster a culture of preparedness, shared risk governance, and resilience in the locality. Women, in particular, realized how crucial their role is in enforcing community resilience as they continue to take on the responsibilities of a matriarch, not just at home but also within their respective communities.

Building on this atmosphere of safety and resilience, a greater call to action becomes evident, where greater investment in resilience leads to the transition from an enduring state of vulnerability to a more robust society that facilitates the principle of 'building back better' as a more effective alternative to emergency response. Investing in community resilience will not only help to reduce the impacts of hazards but will also spark the ground-breaking movement towards creating a safer, more liveable world for generations to come. ■

Varieties of partnerships

The content and intent of partnerships can vary widely. In addition to direct implementation, others can focus, for instance, on advocacy (e.g., the One Billion Coalition for Resilience has a strong element of advocacy). Also, the conventional focus on 'networking' and 'sharing experiences' is changing into more hands-on 'transfer' and 'adaptation' of experiences and lessons. One such example is provided by the work of the Asian Disaster Reduction and Response Network (ADRRN, 2014), which focuses on building disaster-resilient communities by tapping into indigenous knowledge and technology. This network consists of 34 national NGOs from 16 countries across the Asia-Pacific region and works in several countries in the region, including Nepal, where the initiative aims to identify the traditional wisdom and practices on earthquake-resistant building construction, validate these through scientific knowledge, and to distribute them to a wider group of stakeholders. It targets what it calls 'Boundary Partners', those individuals, groups and organizations with which it interacts directly to effect change – in this case

masons and construction technicians, local civil society organizations (CSOs) and their networks, Toll Lane Organizations (TLO) and Toll Sudhar Samiti (TSS) (neighbourhood associations and improvement committees, respectively). Its member organizations carry the partnership approach to their intervention areas, delivering resilience programmes at the grass-roots level. It also engages with research organizations, academia, government officials from the village development committees and municipalities, as well as with the local media (ADRRN, 2014).

In recognizing the potential of partnerships, national governments in many countries are allocating space to other actors such as local authorities, civil society, academic institutions and the private sector. Data collection is one such area where non-governmental actors are beginning to play an effective role. In the Kathmandu Valley – highly prone to earthquakes – the Open Cities Kathmandu Project trained university students, volunteers and government officials to map their communities digitally using the open-source OpenStreetMap (OSM) platform. Launched in 2012 with the support of the Global Facility for Disaster Risk Reduction (GFDRR) and The World Bank, the Open Cities Kathmandu Project helped create base maps of the Kathmandu Valley by digitizing building footprints, mapping road networks and collecting information on other major points of interest. The project surveyed almost 3,000 schools and 350 healthcare facilities over a two-year period. In response to the 2015 earthquakes, more than 6,000 volunteers participated in adding data to OSM, mapping over 80 per cent of the earthquake-hit zones. The information collected was used by the Nepal military, the Red Cross and many other organizations to inform response and recovery efforts. Organizations such as USAID now incorporate the data collected through OSM Kathmandu into disaster preparedness planning exercises (GFDRR, undated).

Another hazard that recurs frequently, and with devastating impact, is flooding. By 2060, almost 1 billion people are expected to be living in coastal cities across the world (Christian Aid, 2016). With climate change affecting rainfall patterns and triggering extreme weather events as well as sea-level rise, vulnerable coastal communities perpetually live with the fear of loss of lives, homes and livelihoods. The fragile riverbanks of Metro Manila, in the Philippines, are home to more than 3 million informal settlers.

The local NGO Urban Poor Associates (UPA) encouraged these marginalized groups to use their political power and use their rights as citizens to lobby the government for better homes. With some training from UPA, they were successfully able to lobby the government to build flood-resistant homes. Known as micro-medium-rise buildings, these three-storey homes are more secure places to live. They allow residents to remain in their communities, close to work, and provide access to clean water and electricity. They accommodate urban vegetable gardens and the ground floor can be used as commercial space. By organizing the residents into groups, training them on

their legal rights and connecting them to the relevant government agencies, UPA helped people to adapt to urban flooding (Christian Aid, 2016).

On the other hand, the Partners for Action (P4A) initiative in Canada demonstrates how targeted data and research can drive coalition-building and lead to a broader public policy discussion on risk-based solutions. Over the past few years, P4A has engaged diverse stakeholder groups – including NGOs, the three levels of government (municipal, provincial and federal) and the insurance industry – on the risks of overland and urban floods in Canada and encouraged Canadian decision-makers to make adaptation decisions aimed at protecting homes, businesses, infrastructure and communities. One of this initiative's biggest achievements has been to ensure that Canadians have access to insurance cover for risks associated with flood damage. Swiss Re ranked the 2013 Calgary floods as the third-largest naturally-triggered disaster globally in that year, resulting in US\$ 6.9 billion in economic losses and US\$ 1.9 billion in insured losses (Swiss Re, 2013, cited in UNEP, 2015).

In May 2015, after several years of research and consultation, The Co-operators, a Canadian insurance company, became the first insurer to bring a home-owner's flood insurance product to the market. Aviva Canada and other insurers have followed since. Although it was clear much earlier on that Canada was experiencing more frequent and severe floods, the insurance industry was divided on the viability of a home-owners' flood insurance product, and concerned about the sustainability of the existing federal government's flood recovery system (i.e., disaster financial assistance arrangements).

A broad-based discussion on the actions necessary to improve flood and disaster risk management was undertaken among all stakeholders and several studies commissioned. A Flood Resilience Roundtable facilitated the engagement of diverse stakeholder groups in adaptation efforts, with approximately 70 senior executives representing insurers, reinsurers, banks, real-estate developers, builders, government and NGOs in attendance. It was agreed that increasing access to insurance cover for flood damage would be accompanied by measures to ensure that Canadians understood the risk that overland and urban flood presents to their homes, businesses and communities, as well as by sound adaptation decisions from policy-makers, aimed at protecting homes, businesses, infrastructure and communities (UNEP, 2015).

The private sector is emerging as a key player in building resilience in many areas. A recent study by the newspaper *The Economist* indicates that while the private sector still sees the government taking the main share of responsibility for the burden of climate-related shocks, companies are also inclined to make greater investments in climate-resilience building due to perceived benefits such as increased competitiveness, improved employee health, greater productivity and lower absenteeism, as well as cost savings (see Box 6.4). There is a clear intent to form partnerships with

government and civil society, which marks a change from past practice, when companies tended to focus solely on their own resilience (EIU, 2014).

BOX 6.4 Climate change and disaster risk: threats to business

Climate change and disasters present a real and increasing threat for business. The private sector is now facing material risks that are already widespread, consequential and expected to continue to increase in intensity and frequency. Climate and disaster risk is growing because of the increase in the intensity and frequency of hazards, along with the vulnerabilities of elements vital to business success including natural resources, workforce and customer well-being, security of operations and installations, and functioning transportation and communications infrastructure. Companies and supply chains are adversely affected by extreme weather and temperature changes, as well as droughts and floods, and the associated impacts on employees and surrounding communities.

But, it is the interaction with social, economic and political factors that can worsen the level of risk. The corporate value chain is threatened not only as a result of the presence of physical hazards but also because of fragilities, weaknesses, deficiencies or lack of capacities in the infrastructure, governance systems and communities that it depends upon. Consequently, any serious approach to building climate and disaster resilience in the private sector must begin with a comprehensive diagnosis of risk and vulnerability.

While the threats to business are clear, they present an opportunity for companies to evaluate their risks and develop a strategy for building resilience. This includes the resilience of their own operations as well as the resilience of the communities within which they operate.

Building resilience

Resilience in the face of complex risk-related issues is no longer something that can be ignored. It is a key component of any forward-looking business. The goal of climate-change mitigation is to slow down the rate of climate change at a global level by reducing greenhouse gas emissions. Seventy-five per cent of the member companies in the network of the NGO 'Business for Social Responsibility' (BSR) are acting in some form on climate change (CDP, undated), primarily through emission reduction initiatives. Larger-scale resilience-building projects covering comprehensive risk issues are yet to be developed and documented to a desirable level.

Despite the importance of risk reduction, many of the climate and disaster impacts that we will experience over the next few decades are unavoidable; therefore, individuals, communities and companies alike will need to find ways to respond and adapt. There are two main approaches companies can take to build resilience:

- 'risk-proofing' the business from physical hazards – e.g., by reinforcing infrastructure to withstand extreme events and building flood defenses to withstand sea-level rises and flooding
- reducing vulnerability and enhancing their ability to adapt to climate change and address disaster risks. Some examples are: providing timely information on meteorological data, building capacity and knowledge on what to do when disasters strike, improving access to finance for rebuilding after disasters, and empowering marginalized communities including women, migrant workers, the urban poor, indigenous peoples, the elderly, and children, among others.

To build adaptive capacity, companies can invest in the maintenance or restoration of many kinds of assets, whether they are physical, natural, governance, technological, knowledge, social or financial. BSR has developed a 'Climate Resilience Wedges' model (Avory et al., 2015) to show the relationship between the different asset types and how they can enhance resilience by reducing sensitivity and enhancing adaptive capacity.

Private-sector resilience building in local communities – lessons from Thailand

In 2011, the worst floods in more than 50 years struck Thailand's central and north-east regions, disrupting all elements of business and society. Villages were destroyed, causing millions of people to become displaced or homeless, and activity at businesses, schools and hospitals ground to a halt.

BSR profiled four organizations and their approaches to building resilience in the face of the Thailand floods. A summary of how they leveraged different assets to enhance adaptive capacity – whether focusing on their own operations, or the communities in which they operate – is provided in the table below:

Organization	Asset type	Approach to resilience building
Sompo Japan Nipponkoa Insurance	Financial	Sompo developed weather-derivative insurance products for rice farmers in north-east Thailand that would provide them with income stability if rainfall over a predetermined period falls below a predefined level.
Fujikura	Physical	Fujikura developed its physical assets, including flood protection works, and reorganized activity zoning within buildings at its manufacturing facilities in Thailand, to help reduce climate and disaster risks. It also enhanced its business-continuity planning to help build the resilience of its operations.
Prudential	Social and Knowledge	Prudential partnered with a local Thai non-profit organization, FOPDEV, to equip vulnerable elderly citizens in northern Thailand with the knowledge and skills to be disaster-response leaders in their communities. This approach helped the elderly create stronger bonds among different groups in their communities, supported by Prudential's network of employees and agents, who provided training and awareness-raising activities about disaster preparedness.
Asian Disaster Preparedness Center (ADPC)	Knowledge	Through its iPrepare Business facility, ADPC is teaching small and medium-sized enterprises (SMEs) in Thailand how they can make their businesses more resilient in the face of climate change, as well as educating SMEs about the business case for building adaptive capacity.

Opportunities for business action

Based on BSR's observations from the four case studies in Thailand, and the experience of working with business, we identify four key focus points for business in investing in resilience:

1. Incorporate resilience-building as a key dimension of risk management. For example, climate change and water security can be added as key components of corporate due diligence and risk assessment protocols
2. Adopt a holistic approach to building adaptive capacity that considers the relationship between the company and society, the natural resources they depend on, the people they employ, the customers or suppliers they work with, and the social licence to operate granted by local communities
3. Identify opportunities to collaborate with public- and private-sector players in order to amplify the impacts of resiliency efforts
4. View increasing adaptive capacity as a business opportunity. Tracking corporate costs, investments and returns on investment (ROI) on resilience initiatives can help to assess and support the business case for investment over time.

As climate change and disaster impacts on the private sector become more pronounced, particularly the risks inaction poses to business continuity and long-term sustainability, developing an approach to building the adaptive capacity of a company's own operations and the communities around them will become a vital business focus. ■

Partnerships can be seen as central 'animators' of resilience-based strategies or responses to conflicts and complex emergencies. A discussion paper on the Syrian conflict, prepared by the UN in 2013, proposes what is called a 'resilience-based development response'. This strategy, based on collaborative action, aims to support the efforts of national and regional governments to ensure the provision of quality housing and related services for sustainable habitat (water, sanitation, energy and waste removal) and the rehabilitation and reconstruction of social economic infrastructure affected by the ongoing crisis.

It also seeks to build the capacity of citizens to engage in decision-making processes and work with local governments in developing a policy environment geared towards the delivery of basic social services, which include health and education. Strengthening technical and managerial capacities of municipal governments to deliver services, and establishment of mechanisms at local levels to promote peaceful coexistence between conflict-affected populations are integral to this approach (UN, 2013).

In reality, resilience-based development action offers numerous opportunities for partnerships to deliver dividends at multiple levels. In the Indian state of Himachal Pradesh, the local Red Cross Society has been working closely with the local government, NGOs and volunteers to respond to the growing imbalance in the child gender ratio within the local population, which has resulted in some areas having as few as

about 700 girls per 1000 boys. While the immediate objectives were to protect the girl child, the activities extended to cover health, nutrition, education, sanitation, livelihoods and the environment, making the programme a vehicle for building resilience at the larger community level.

In contrast, developmentally-oriented resilience action can equally be far-reaching, provided that it is based on partnerships that can ensure a wide outreach of the objective and its long-term sustainability. Formal disaster-reduction partnerships at local levels have long been advocated but have proven to be challenging to sustain beyond the term of a specific project and its related source availability. The NGO SEEDS India's initiatives on urban risk-reduction partnerships have attempted to address this through enabled citizen focus groups. Projects to establish such institutions in the small but high-risk towns of Mussoorie and Dharamsala in the Himalayan north of India, commenced in 2010–2012, have been sustained well beyond the inception support period (SEEDS, 2015).

Although to a larger scale, a similar intervention in East Delhi has worked through resident welfare associations, local community-based organizations, schools and the local government, leading to the emergence of the Purvi Dilli Apada Prehari (PDAP) group, with its name signifying it to be an East Delhi disaster watch group. Supported by UNICEF, the intervention is engaging with middle-income families, alongside the low-income and most-vulnerable groups as a measure for long-term sustainability. This approach has been found to be successful in the past, and is extending the scope of PDAP's regular work to cover urban management issues at city and neighbourhood levels that affect day-to-day life. Partnerships for such objectives, even at local community levels, need to extend across classes in order to be sustainable. This is easier said than done, of course, and requires the funding of common denominators and investment in 'softer elements', such as relationship-building, that need small financial resources but can yield strong partnership dividends.

Towards better partnerships that build resilience

Partnerships among stakeholders can thus take many forms, serving a variety of objectives. Documentation of recent experiences and lessons learnt by several organizations and initiatives (e.g., reports by The World Bank and The Partnering Initiative) highlight the following key factors in building effective partnerships at local, regional and national levels:

- 1. Understanding and trust** – stakeholders, including communities, NGOs, the private sector and governments at different levels, must understand each other's perspectives and sufficiently trust each other's motivations. For this to occur it is imperative to establish dialogue mechanisms, formal and informal, to enable them to share their respective concerns and priorities regularly

2. **Transparency** – open and inclusive planning of development priorities, accompanied by decentralization and flexibility in the allocation of resources, is critical in order to build grass-roots ownership and stake in any partnership
3. **Incentives** – it is important to establish clear incentives for local, national and regional governments, policy institutions and researchers to partner with communities and the private sector
4. **Measurement of impact** – clear and measurable indicators must be established to assess the impact of partnerships in resilience-building. Incentives could be linked closely to these indicators
5. **Institutionalization** – build institutional capability for partnering, including developing strategies, systems and processes and individuals’ partnering skills and understanding in order to scale-up, institutionalize and formalize partnerships that demonstrate effective win-win solutions (Reid et al., 2015; World Bank, 2015).

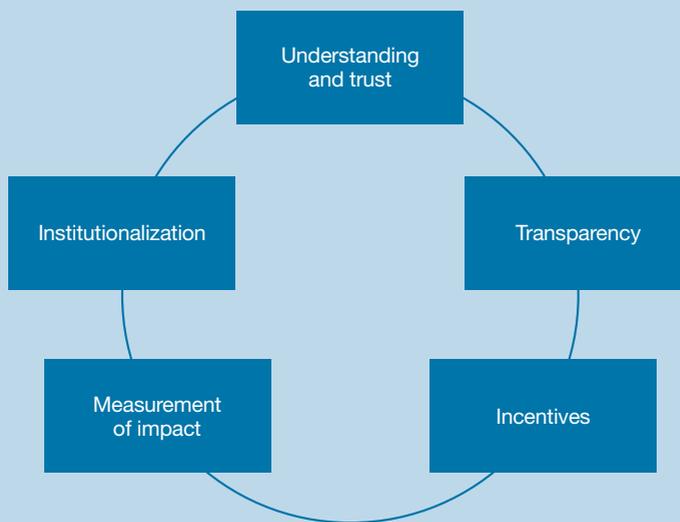
At the same time, it is equally important to establish effective partnership arrangements at the global level, to enable stakeholders to contribute to worldwide policy-making and implementation, as well as to monitor the various global goals and targets recently agreed. An illustrative proposal is provided by the General Assembly of Partners (GAP), a stakeholder platform engaged with Habitat III. GAP proposes five areas of intervention towards implementation of the New Urban Agenda, the main outcome of this conference. All five areas are based on the understanding that engagement of a variety of stakeholders is central to realizing the goal of sustainable and inclusive urbanization.

The first is promoting the open sharing of knowledge, expertise and experience, which would evaluate and generate policy-relevant, but not policy-prescriptive, research around topics critical to sustainable urban development. The second relates to advocacy, to offer advice on matters of participation and issues of sustainable urbanization based on stakeholders’ knowledge, experience and expertise (see Box 6.5 below). The third area promotes innovation laboratories to support pilot programmes sponsored by multiple partners. The fourth area concerns monitoring, focusing on participatory data collection for both qualitative and quantitative indicators, particularly those that are not included in the ‘formal’ UN monitoring frameworks, such as gender-age-race-responsive, community-generated, geographic and other indicators. The fifth and final area looks at investment, which involves engaging representatives from civil society organizations to support and advise on all investments made by international financial institutions (IFIs) as well as from bilateral donors for urban infrastructure and development (GAP, 2016).

Similar (and perhaps more progressive) multi-stakeholder partnership arrangements and mechanisms are being developed elsewhere. UNISDR’s Making Cities

Resilient campaign provided advocacy and an experience-exchange platform to support cities in assessing and enhancing their own resilience (UNISDR, undated). UN-Habitat's City Resilience Profiling Programme focuses on institutionalizing multi-stakeholder assessments on urban resilience. The Principles for Sustainable Insurance (PSI) Initiative, led by UNEP Finance Initiative (UNEP FI) is the largest collaborative initiative between the UN and the insurance industry, wherein PSI serves as a global framework for the insurance industry to address environmental, social and governance risks and opportunities.

FIGURE 6.2 Key factors in building effective partnerships



BOX 6.5 Learning from people's actions: Canaan, Port-au-Prince, Haiti

The January 2010 earthquake in Haiti destroyed and damaged over 200,000 homes and displaced more than 1 million people, predominantly in the capital city of Port-au-Prince. While the numerous NGOs and other assistance agencies focused on supporting rehabilitation of the severely-affected informal neighbourhoods, many Haitians directed their attention and resources to building an alternative recovery and future, to the north of the city in a previously uninhabited area called Canaan. Over the past six years, Canaan has grown into the fourth-largest urban area in the country, with a population of more than 200,000. This represents a massive mobilization of local grass-roots organization and private and/or redirected humanitarian resources.

Canaan provides important lessons for future crises: (1) that recovery is a process of change and adaptation as much as a process of restoration; (2) that we need to understand underlying dynamics of housing and urbanization in order to understand and strategically support post-crisis housing recovery and urban development; and (3) that, even in challenging conditions, there is considerable local capacity, momentum and self-organization.

Since 2010, there has been a range of learning initiatives in Canaan, from remote image analysis of land use to the documentation of personal stories and drivers towards the new city of Canaan, as well as sociological studies on the role of churches in community structures to sustainable water supply options. These projects have been undertaken through academic research, government contractors and via participatory action research, contributing to continued policy development by concerned authorities, and to programme design by intervening development agencies. Learning in Canaan has been a collaborative exercise with the many communities which make up the new zone of Port-au-Prince towards co-produced analysis and has become a valuable model of multi-disciplinary real-time research. This has led to creating a complex and progressive understanding in a rapidly-changing and highly-charged context.

Early in 2010, the Government of Haiti declared the zone at the foot of the hills north of the city as state land, triggering a massive informal process of property development. In a city where approximately 75 per cent of the population had been living on 25 per cent of the urban land before the earthquake, the northern zone, collectively known as Canaan, provided not only an option for those made homeless by the earthquake but also an opportunity for renters and investors to access land and construct houses.

Port-au-Prince had seen opportunistic rapid urbanization during previous periods of political and economic crisis over the past two decades. Land invasions and subsequent unregulated informal construction had resulted in some of the highest-density neighbourhoods in the western hemisphere. Pre-earthquake plans for the metropolitan region of Port-au-Prince had already earmarked areas to the north for city expansion. Despite the historic urbanization pattern and the pre-existing plans for the north, authorities and development actors were not prepared for the scale and speed of the growth of Canaan, nor were they well equipped to resolve institutional and technical challenges. For example, difficulties related to administrative responsibilities, tenure status and the prospect of constructing a new city without adherence to building or planning regulations and with complex retrospective provision of basic infrastructure including roads, electricity and water supply.

Critical to addressing all of these issues was better understanding of and engagement with the informal development process: who were the new residents and other stakeholders? How were they organized? What were the power relationships? What were they building? How were they making a living? Where were they accessing services? What public structures were being developed? What were their difficulties, priorities and plans for the future?

From 2010, several humanitarian organizations supported earthquake-displaced families in Canaan, many considering the initial early settlement as a temporary camp situation. Organizations such as Techo (*Un Techo para mi País*) remained, supporting vulnerable households and

community development. However, post-earthquake reconstruction funding was generally committed to areas of direct disaster impact and as a result of the illegal land invasion process in Canaan, most humanitarian organizations were reluctant to become involved. In 2011, UN-Habitat – with support from Cambridge Architectural Research – documented the process of land parcelling, the typology of housing construction, and the extent of investment to date. They argued that what had been perceived as a chaotic emergence of a slum was, in fact, well organized, representing housing development by a mix of income groups and already of more than US\$ 60 million in permanent housing construction (estimated at over US\$ 100 million in 2013).

At the start of 2012, the recently-established Haiti Government Office for Construction, Dwellings and Public Buildings (Unité de Construction de Logements et de Bâtiments Publics – UCLBP) launched an urban planning exercise, proposing measures for rationalization and formalization of Canaan. However, the plan yielded limited results, as it depended on extensive state resources and a highly interventionist methodology. Subsequently, the approach by state agencies and by assistance partners has been to build on the existing local development processes and resources through research, analysis and engagement with community stakeholders. The outcome has been the generation and implementation of local area plans, guidance for safer and more sustainable housing construction, and support for enterprise, social initiatives, demand-driven services (such as kindergartens, schools, water kiosks, places of worship), natural resource management and disaster risk management.

Since 2013, USAID, American Red Cross, Habitat for Humanity Haiti, Global Communities, Techo, UN-Habitat and others are assisting the development of Canaan, through a collaborative platform led by the Government of Haiti UCLBP, line ministries and local authorities. Their collective approach recognizes the scale and speed of development in Canaan as a city and system, using action learning to diagnose challenges and identify opportunities to leverage and add value to local capacities and resources through strategic interventions.

The humanitarian and development community recognize the Haiti earthquake response raised critical questions about how to respond in urban crises: what roles should they play? What mechanisms should they use? How can the capacity and contribution of grass-roots community members/organizations be leveraged? In the years following the initial response, for many agencies, Canaan provided answers to those questions. The role of humanitarian organizations was not to construct Canaan, or even to provide the resources for its construction, but to recognize, understand and learn from the thinking and actions of disaster-affected individuals, communities and others who share their city. The role of humanitarian organizations, including technical, social and economic professionals, was to facilitate this learning and use it to enable better processes for its current and future development and governance, including informed and participatory decision-making, social protection for the vulnerable, optimizing capacities and momentum, and providing appropriate advocacy and advisory support for urban institutions. ■

Challenges, opportunities and the way forward

For partnerships to become close to being aligned with the definition given earlier, they need to address, or preferably avoid altogether, inequalities. This does not mean that partnerships have to necessarily be equal (e.g., which party has the final say on a disagreement, or carries eventual liability), but to be effective they do need to be equitable, i.e., fair, to all sides. Recognizing this, and the points made earlier in this chapter, the ODI advocates that such agencies should ‘recast’ their role towards an approach based on subsidiarity, i.e., downwards accountability, involving “changing funding models and incentive structures to reward collaboration, collective effort and positive outcomes for communities” whereby the focus would be on “reorienting partnerships from transactional arrangements to longer-term and strategic alliances” (Bennett, 2016, 71).

There are other barriers to realizing more meaningful and effective partnerships. Firstly, inadequate political will means that, in many countries, engaging stakeholders is seen as similar to sharing power – or worse: relinquishing control of decision-making to non-state actors. A clear recognition of the value of stakeholder engagement and contribution is needed in order to achieve the mindset shift necessary in building broad-based partnerships. Secondly, when knowledge remains unconsolidated, partnerships can suffer. There are many examples of extremely effective pilot projects, small and large-scale interventions focused on partnerships, but these are not always documented, shared, or processed for extracting lessons. As a result, many are never scaled up. More effort is required to develop and share knowledge in relation to partnerships for resilience building.

At the same time, there are opportunities as well. Partnerships can take advantage of technology, which provides the potential to transform radically the way we do business. Through rapid private-sector-led advances, it is now possible to send money to remote corners of Kenya, predict rainfall levels and obtain advice on cropping patterns in India, monitor air quality and take corrective steps in real-time in Beijing, map urban violence and crime hotspots in Bogota – all through mobile-phone apps that use satellite data and predictive modelling.

In the same way, it should equally be possible to set up virtual teams of experts, hubs with different mandates, strengths, capacities, geographic domains, to provide support on a real-time basis to a city or to human settlements in the grip of disaster or crisis, or for resilience-building efforts, whether on engineering or planning solutions that have worked or could work, or appropriate building materials and (re)construction techniques, or careful site selection and layout of settlements, or innovative measures to collect or use grass-roots data. Project managers on the ground could then select elements from the good practices or tools on offer, and put them together to develop a custom-built approach to address their particular problem. In return,

they would provide feedback from the field on what worked and what didn't (and why), so that those based in the knowledge or learning hubs could incorporate these lessons into their teaching, research, writing and policy-informing activities, thus closing the loop.

Of course, none of this is possible without resources – although these do exist in some places. The USAID/Rockefeller Foundation Resilience Partnership described above encourages uses of innovation and crowdsourcing in the programmes (via its Resilience Challenge funding mechanism). Similarly, the increased interest in innovation (discussed in Chapter 3) has been matched by new funding channels, such as the Humanitarian Innovation Fund (HIF), which specifically welcome innovative collaborations among diverse actors. However, traditional donors, whether bilateral or multilateral, need to move away from strict output-based financing to supporting long-term trust building, and strengthening relationships. At the same time, the private sector needs to be mobilized in creative ways. 'Collaborative disruption' models have gained popularity over recent years, e.g., in industries where technology entrepreneurs and other entities join hands with industry leaders to solve some of the most critical problems faced by the latter (e.g., the IKEA Foundation and UNHCR's partnership to innovate in emergency shelter). These could provide huge potential in funding and implementing new partnership opportunities in the future.

Conclusion

It is clear from international policy discussions, as well as from national and local-level actions, that partnerships are central to reducing risk and enhancing resilience of communities, settlements and, indeed, nations. However, the nature of partnerships needs to improve. At the global level, humanitarian and development actors should work closer together, or at least in tandem (which is something the World Humanitarian Summit's *Grand Bargain* recognized, as discussed in Chapter 1). National, regional and local governments need to work better together. At the same time, more partnerships leading to specific and achievable actions need to be built among governments, civil society, professionals and the private sector. Mutual trust, respect and transparency need to be a fundamental part of all these collaborations. Also, equity (fairness) needs to be ensured between collaborators, so that they really are partners.

With the rapid pace and scale of urbanization, the development of partnerships in urban contexts needs special attention. This provides considerable opportunities for innovation, especially to solve current and future challenges. At the same time, in the context of an increasingly connected and digital world, technology can be deployed as an effective enabler of partnerships. New models of collaboration – and, importantly, financing – need to be explored. Clearly, ‘business as usual’ cannot be expected to respond, or build resilience, to the unusually vast range of crises facing the world that will undoubtedly happen in this century and beyond.

Chapter 6 was written by Shipra Narang Suri, international urban consultant and Vice-President of the International Society of City and Regional Planners (ISOCARP), The Hague, The Netherlands. Box 6.1 was written by Marcus Oxley, Executive Director, Global Network of Civil Society Organisations for Disaster Reduction (GNDR), London, UK; Box 6.2 by Leda Stott, Partnership Director and Research Fellow, Innovation and Technology for Development Centre at the Technical University of Madrid, Spain; Box 6.3 by Maria Fellizar-Cagay, Deputy Executive Director, Center for Disaster Preparedness Foundation, Manila, Philippines; Box 6.4 by Brooke Avory, Manager, and Edward Cameron, Director, Business for Social Responsibility, Hong Kong; and Box 6.5 by Mike Meaney, Chief Operating Officer, Habitat for Humanity Haiti, Port-au-Prince, Haiti, and Maggie Stephenson, Researcher, University College London, London, UK. Content on the link between developmental and resilience initiatives along with the Indian case study has been contributed by Rosemarie North, IFRC Communications and Advocacy Manager, Geneva, Switzerland.

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Resilience in the future: 2025 and beyond

*“As for the future,
your task is not
to foresee it,
but to enable it”*

Antoine de Saint-Exupéry

Stretched to the limit is the refrain dominating discussion in humanitarian circles today to describe the inadequacy of international and local responses to disasters triggered by natural hazards and to conflict (ALNAP, 2015). In fact, the limit has been exceeded. As the scale and severity of humanitarian crises continue to mount (Esslemont, 2015), experts are warning that the international humanitarian system is “on the brink of failure” (Chandran, 2015) and that it is time to “remake humanitarian action” to meet present and future challenges (Bennett, 2016).

As millions falling under humanitarian mandates remain inadequately served or underserved, calls for a systematic investment in resilience building are growing (UN, 2016). This requires breaking through the humanitarian-development divide. It also means recognizing that local populations are the first and last responders to any crisis and strengthening their ability to cope, adapt and overcome disasters must be at the centre of meeting growing humanitarian needs (IFRC, 2013).

As we project forward to 2025 and beyond, identifying who will be most vulnerable to what risks is no easy task. Exposure and vulnerability are dynamic. Risks vary across time and space and depend on economic, social, geographic, demographic, cultural, institutional, governance and environmental factors (IPCC, 2014). While we know that climate change will amplify existing risks, it is also likely to create new unanticipated risks. In addition, it is not just extreme weather events that we need to worry about: as more people crowd into flood plains, informal settlements and other high-risk areas, routine hazards can quickly transform into major catastrophes (CRED, 2015). This makes predicting the future accurately very difficult.

When it comes to identifying people and places most at risk to disaster, evidence is increasingly pointing to the notion that it is the cumulative effects of overlapping political, social, economic and environmental risks, rather than single drivers alone, that matters (IDMC, 2015; International Alert, 2015). If building the resilience of local populations and their institutions is the goal, we will need to become better at understanding which local coping systems are most fragile (susceptible to breakdown) and those likely to be overwhelmed by an accumulation of internal and external risks.

Suspa Chhemawati village, Dolakha, Nepal, 2015. A representative from Nepal's National Red Cross Society holds up an infant boy born shortly after the 2015 earthquake. This village is benefiting from the construction of the pilot house being built. IFRC and partners provide building demonstrations and model houses as part of the recovery programme aimed at training local masons and builders in improved earthquake-resistant construction techniques and preparing a model home for demonstration purposes.

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A future with interlocking and complex threats

The future environment of humanitarian response, along with the predominant threats challenging the world, will drive practice in 2025 and beyond. As urbanization and uncertainty characterize this environment, the interrelated nature and complexity of the risks we are expected to face is becoming clear. Singular risks, such as the unsustainable pace of unplanned urbanization, climate change or conflict, cannot be seen or addressed in isolation. They cause a cascade of further risks, compounding the challenges for international and local humanitarian actors.

Over the coming years, three key threats illustrate how current trends may collide into complex crises that will demand a change in humanitarian practice: climate change, violence and pandemics. It is not just these risks in isolation that worry humanitarians most; rather, it is the convergence of these threats, which is becoming increasingly visible and most disconcerting as well. The pathways for convergence can be seen in how climate change stresses populations, drives displacement into underdeveloped urban areas, contributes to disease outbreaks and potentially fuels conflicts. In addition, as rapid urbanization and growing inequality create pockets of chronic poverty while conflicts and displacements become protracted, any further shocks will create situations of acute crises layered over chronic crises. Given demographic trends, these threats are likely to be most pronounced in urban areas, placing cities on the front lines of 21st-century humanitarianism.

Climate change

The most recognized trend of concern is that of climate change; and it is not climate change alone but its multiple interactions with urbanization, displacement and conflict that worries humanitarian actors most. Even with the most aggressive action, temperatures are likely to rise 2°C (35°F) by 2100 (IPCC, 2014). As global average temperatures rise so too will sea levels. Current forecasts by the Intergovernmental Panel on Climate Change (IPCC) predict a global mean sea-level rise of 0.4 metres (1.3 feet) by 2100 in the lowest and best-case scenario and up to 2.0 metres (6.5 feet) in more pessimistic cases (Church et al., 2013; DeConto and Pollard, 2016). While this progression is measured on a long time-scale the impacts are felt immediately. The result will be more frequent, unpredictable and extreme weather events (NASEM, 2016). Low-lying coastal zones below 10 metres (32.8 feet) are the most vulnerable with at least 1 billion people living in such areas in Asia and Africa alone (Neumann et al., 2015). Entire nation states in the Pacific islands such as Tuvalu and the Marshall Islands, which exist completely below 10 metres (32.8 feet), will become uninhabitable. Five of the islands that make up the Solomon Islands recently disappeared into the sea this year as villages on other islands washed away.

While gradual sea-level rise and warming temperatures in and of themselves have destructive consequences, they also contribute to water and food insecurity, driving population displacement and, in some cases, conflict. The changing climate will impact food production and the availability of water through drought, flooding, salinization and decreased rainfall leading to infertile land.

The changing climate will drive displacement at a scale unknown, also. Current estimates of forced migration due to environmental change vary dramatically from 25 million to 1 billion people by 2050 (IOM, 2014). Although some of this migration will be slow and adaptive, much of it will be sudden and harmful displacement. This displacement has obvious imperatives for humanitarian action and may also trigger conflict. While the causal links between climate displacement and conflict have yet to reach scientific certainty, the pathways are becoming clear and more evident as migrants can demographically and economically stress host populations, worsening and igniting political and ethnic conflict (Werz and Conley, 2012). Protracted conflicts in Darfur and the Sahel have been cited as evidence of climate change playing a direct role in the instability of countries and regions, potentially fuelling conflict (Mazo, 2009). These cascading effects of climate change exemplify how future threats could become ever more entangled.

Dealing with cascading effects efficiently also requires a calibrated and incremental response. As opposed to bouncing back, the process may involve recovering to a new reality, as the old normal may neither exist nor be viable. This is examined further in Box 7.1 below.

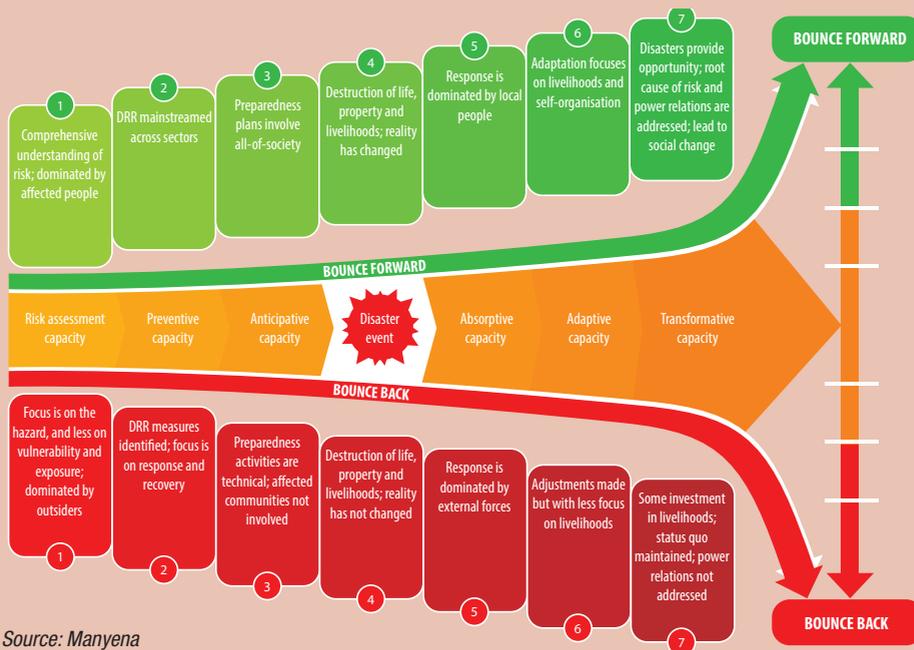
BOX 7.1 From bouncing back to bouncing forward: lessons from Mozambique

‘Bouncing back versus bouncing forward’ is a way of thinking about resilience. It represents a shift from a reactive to a proactive transformational agenda that goes beyond recovery from disasters. Figure 7.1 (below) illustrates bouncing back and bouncing forward along a time-scale. The bouncing-back view of resilience assumes a return to the ‘normal’ situation *before* the disaster event. Thus, disasters do not necessarily bring about change in affected communities. The conditions that may have caused the disaster in the first place are maintained, even if the affected communities are worse off than prior to the disaster. This is in sharp contrast with the bouncing-forward view of resilience, which recognizes that disasters are accompanied by change. New opportunities and possibilities emerge for enhancing resilience by developing preventive, anticipative, absorptive, adaptive and transformative capacities.

Three resilience outcomes are likely. Firstly, the bouncing-forward view provides an impetus towards social transformation to address the root causes of disasters and also strengthen the capacities to deal with the risk drivers. Secondly, communities may recover but ‘bounce nowhere’, become worse off than before the disaster, or they may be in a state of transient collapse. Thirdly, at worst, communities can descend into permanent dysfunction with significant levels of vulnerability.

A clear understanding of risk drivers (hazards, vulnerability and exposure), and their relationship in producing a disaster, determines the kinds of capacities needed for communities to deal with disasters. While prevention is the outright avoidance of adverse impacts of hazards, it may not be possible to eliminate all the risks. This requires anticipative capacity or proactive actions, through preparedness and response activities to absorb the impact. Examples include mobilization of surge capacity, civil-military resources, and local community response systems. Drawing lessons from the disaster event, the affected community may adapt or adjust to the risk drivers through anticipatory, spontaneous or planned actions. In this way, resilience bridges disaster risk reduction (DRR) and climate-change adaptation and sustainable development. While preventive, anticipative, absorptive and adaptive actions, at best, enable the status quo to be maintained, the transformative actions create a new system for dealing with the root causes of vulnerability to disasters.

FIGURE 7.1 Bouncing-back and bouncing-forward resilience pathways



Source: Manyena

Lessons from Mozambique

Mozambique provides an example of a shift from bouncing back to bouncing forward. Being a low-income country, with a gross domestic product of US\$ 16.39 billion and a population of 27.22 million, it is highly vulnerable to disasters, mainly to those triggered by hydro-meteorological hazards such as cyclones, floods and droughts. Drawing lessons from the 2000 floods, Mozambique has, over the years, gradually enhanced its disaster resilience. In the 2000 floods, 800 people died as compared to 113 people who died during the 2013 floods despite the fact that both floods had similar geographical coverage and magnitude. The 2000 floods marked the turning point for building

disaster resilience in Mozambique. Before the 2000 floods, there existed an ad hoc committee that was hastily assembled to respond to the disasters.

To understand disaster risk drivers comprehensively, the Mozambican Government, through the National Institute for Disaster Management, embarked on a three-phased approach. During 2008 and 2009, a study on climate change concluded that “climate change and disaster risk go hand in hand, as most of the impacts of climate change would be felt in the form of the worsening risk, spread, intensity and frequency of natural disasters”. This underlined the relationship between vulnerability and exposure to climate change, and its impact on DRR, national investment, and poverty reduction. The second phase (2009–2012) involved three pillars: a strategy pillar, a capacity-building pillar and an implementation pillar, while the third phase implemented the solutions to problems identified in Phase one.

Based on these phases, the Mozambican Government has focused on enhancing its resilience capacities. To improve the disaster prevention and mitigation capacity, the 2006 *Master Plan for the Prevention and Mitigation of Natural Disasters* has been revised and broadened beyond the initial bias towards agriculture to include wider resilience issues. Critically important is that, although some laws, such as those related to mining, environment and fisheries, are still weak in integrating resilience, the master plan has set the basis for mainstreaming resilience into strategic planning documents, particularly the *National Action Plan for Poverty Reduction* and the *2010–2014 Five-Year Plan*.

The disaster management information system has been one of the flagships of anticipative capacity development. In the 2013 floods, the communities who had access to early-warning information were less impacted by the floods than those who did not. They were able to escape from the deluge with their belongings, including livestock. As now has become a tradition, the 2015–2016 contingency plan identifies the anticipative measures, including a simulation exercise, activation of sector working groups, organization and deployment of teams to support preparedness actions at sub-national levels, emergency logistics, activation of early-warning systems, and preparedness for critical infrastructure such as schools and hospitals.

While adaptation can potentially strengthen prevention, mitigation, anticipation and absorptive capacities, there are specific measures that have been undertaken in Mozambique related to adaptive capacity development. In recognizing that the impact of climate change will not only lead to a 2 to 4 per cent decrease in yields of the major crops over the next 40 years but also lead to 4 to 9 per cent revenue losses by 2030 for cities of Beira, Maputo and Quelimane, a *National Climate Change Adaptation and Mitigation Strategy*, supported by a dedicated Ministry, was developed in 2013 to address this problem. As disaster resilience is a top governmental priority, new plans for development should be risk informed.

Realizing that disasters such as the 2000 floods can be a symbol of state failure, and a potential source for social discontent, Mozambique has used disasters as ‘windows of opportunity’ to build resilience. In 2014, Mozambique developed a new disaster management legislation, which provides an institutional and a multi-sectoral framework for building resilience. Given the high levels of multiple exposure and multiple vulnerabilities to multiple hazards, coupled with the lack of institutional capacity, poor-quality infrastructure and deficits due to the protracted civil conflict, it is hoped that the disaster management law guidelines, which are currently being developed, will support community self-organization to demand increased accountability from government and ultimately help communities to bounce forward from disasters. ■

Violence and conflict

Trends in violence and conflict mirror the interrelated complexities described above. While the number of conflicts globally has declined over the past 70 years, recent trends have seen the frequency and intensity of armed conflict and terrorism rise. Conflicts are also becoming far more protracted and chronic (von Einsiedel et al., 2014). Modern warfare is increasingly urban as well. The number of people violently killed a year has tripled, driven largely by deadly conflicts unfolding in cities across Syria and Iraq, but also in Afghanistan, Ukraine and Yemen. Terrorist violence is also on the upswing with the vast majority of attacks concentrated in just 20 cities in Iraq, Nigeria, Pakistan, Somalia and Syria.

Criminal violence is now even deadlier than armed conflict and terrorism in terms of lives lost. At least four times more people around the world die as a result of homicide. While men are the major perpetrators and casualties of this violence, women suffer disproportionately from non-fatal violence (World Bank, 2011). In some cases, extreme homicidal violence has caused millions of people to flee violence, including gang hot spots in Central and South American cities such as Acapulco, San Salvador, San Pedro Sula and Recife (IDMC, 2016).

The intensity of this violence and its consequences exceeds the thresholds applied in armed conflicts that would invoke international humanitarian law and engage humanitarians under typical mandates. As a result, more and more humanitarian agencies are starting to recognize that this violence represents 'war by any other name'. From the International Committee of the Red Cross to Médecins Sans Frontières, the sheer violence and the population displacements that criminal violence forces, have rightly pushed humanitarian actors to reinterpret formal mandates and consider how to access populations trapped by urban violence.

Traditionally oriented towards rural operations, humanitarian agencies are proving unprepared to meet the urban future. Take the case of Bangui, Central African Republic's besieged capital. Following the eruption of violent sectarian clashes which killed more than 60 people and displaced thousands, humanitarian agencies were caught wrong-footed. In spite of massive UN peacekeeping and aid operations, the violence could not be stopped and aid delivery systems were paralysed. Bangui came to a standstill and its citizens were trapped, cut off from basic supplies of medicine and food for days. Even veteran humanitarian organizations, such as Médecins Sans Frontières with 20 years' experience in the country, were unable to respond to those most in need. Bangui is hardly an isolated incident, but something of the new normal. The storyline is unsettlingly familiar in the wake of crises in Port-au-Prince, Abidjan, Mogadishu, Baghdad and Kabul, to name a few.

The humanitarian consequences of this violence extend beyond the direct measures of assaults, injury and deaths. Violence that is now chronic and embedded in

daily lives creates an environment of insecurity which can be debilitating. The outcomes are not just violent deaths but also urban residents being cut off from access to food, medicine and basic services. This environment can limit the mobility of vulnerable populations and render them unable to access basic needs from health care to social support networks, to livelihoods and markets presenting a silent humanitarian challenge. The burden is particularly heavy on women and girls who are subjected to gender-based violence inside and outside of the home. Last, but certainly not least, the mental health consequences of this violence and insecurity, undoubtedly large, remain under-measured, under-treated and unknown in terms of scale, scope and long-term impact.

Pandemic risk

The interrelated nature of risks to health play out further when considering the threat of pandemics. The Zika and Ebola outbreaks highlight the risk globalization poses as larger and formerly disconnected population centres are more easily exposed to viruses that were once isolated or self-limiting. Displacements into urban areas and rapidly-growing slum populations further compound the risks of pandemics. As cities in many disaster-prone zones struggle to maintain adequate healthcare systems (including water and sanitation infrastructure, disease surveillance, early warning and rapid containment), they will become centres of outbreaks. With inadequate capacity to respond, small outbreaks may go unnoticed and even when identified, the inability to respond effectively in places such as urban slums poses a grave threat. The disastrous attempt to quarantine the entire Liberian slum of West Point exemplifies the types of practices to which some cities may resort. In an ill-conceived effort to limit the spread of Ebola throughout Monrovia, the government used security forces and fencing to lock in an estimated 75,000 people living in the community. This quarantine not only led to increased violence and a spike in food prices but also to limitations for residents in accessing basic services while having no impact on containing the disease (Eba, 2014).

Climate-change will alter environments across the globe, facilitating the spread of disease by creating a conducive environment for the vectors that carry them. Research shows that climate change with rising temperature and greater humidity has increased the habitable altitude and range of the Anopheles mosquito, causing greater risk of Malaria (McMichael et al., 2004). While actual rates of Malaria have fallen due to concerted anti-Malaria campaigns, climate change has spread the risk. The Zika outbreak represents another threat posed by the expanding mosquito range. Climate-change-induced warming waters have also highlighted the risk for Cholera to spread beyond its endemic environments in the Bay of Bengal and a few other places (Rita, 2009).

The threat posed by pandemics is now more daunting than ever conceived. This most recent experience has shown that the future of pandemics may be a terrifying one, forcing governments and even countries into lockdown procedures. Local governments, the humanitarian community, and the world as a whole, are ill equipped to contain, let alone extinguish, these threats.

Addressing complex threats with comprehensive thinking

Building resilience to these future threats facing the world will clearly require a comprehensive approach that addresses the multiple drivers which lie at their base. Single shocks can be enough to throw populations into a downward and protracted spiral. In a world of interlocking threats, the compounding effects of multiple shocks and stresses can descend an entire region into a new equilibrium from which it is difficult to recover.

Individuals, households, communities and systems have developed protective features against these risks that contribute to various stages of recovery – and can continue to do so. Yet, the varying ways in which these risks and protective qualities interact to mitigate impact and enable recovery are still not completely understood. A deeper understanding of these interactions is necessary. It is clear that limited and isolated measures such as reducing exposure or training healthcare workers to address individual risks is not enough. As the risks facing vulnerable populations become further interwoven, practice must keep pace with complexity, requiring innovative approaches that may lie outside of typical mandates and experience. Falling short of this approach with simplistic analysis and reactionary responses will continue failing vulnerable populations. Taken together, these new approaches demand a resilience framework that forces a deeper understanding of risk at the development-humanitarian link and stimulates appropriately comprehensive solutions. The challenge is daunting but not insurmountable; concrete steps can be taken to enable this process, learning from positive nonconformity in the face of these threats and the multiple efforts, described below, currently under way.

Enabling a more resilient future

As it stands today, resilience building is not a core priority for humanitarian actors. It remains relegated to a “small corner of humanitarian action” (ALNAP, 2015). Given the tremendous needs in war zones and in the wake of disasters triggered by natural hazards, the priority is understandably to provide life-saving relief. Preparedness initiatives that build resilience have been regarded as merely an after-thought when planning an exit strategy.

But this is not enough. Building resilience must be part of response – before, during and after a crisis. Entry and exit from populations in need is a false and failing paradigm. Instead, populations cycle from vulnerability to acute crisis and back. Humanitarians will need to do more and work together with development actors and local authorities to reverse fragility (fragility being understood as “a rapid deterioration in the ability of authorities to deliver core functions of safety, welfare and risk governance”) (de Boer, 2016). Doing so will require investing in factors that prevent the risks of violence, climate change and pandemics from rapidly deteriorating and overwhelming local coping systems.

As we look ahead to 2025 and beyond, there are at least three things that should be done to enable a more resilient future. First, it is important that development and humanitarian actors, at all levels, *develop a shared understanding of resilience* that can guide decision-making. Second, it is essential that we deepen our understanding of *how to ‘operationalize’ resilience* in a way that tackles the key threats mentioned above. Finally, we need to leverage advancements in technology and our knowledge base to improve our *ability to understand disasters* when they happen. ‘Futures studies’, explored in Box 7.2 below, can help in perceiving these potential realities better, and in moving ahead in the right direction.

BOX 7.2 How do we get there from here? How futures studies can help agencies achieve resilience

Following the end of the Cold War, the humanitarian community struggled to define its role; since the beginning of the ‘War on Terror’, it has increasingly questioned the future of that role. A number of reports, such as the 2011 International Review of the Red Cross special issue on *The Future of Humanitarian Action*, have sought to identify the major trends that will affect aid organizations, including demographic changes, climate change, rapid urbanization, and shifts in the geopolitical landscape.

Collectively, our vision of the future is just more of the same challenges that we face today – more ageing populations, more climate change, more urbanization – but the future is likely to be far more complex than our strategic plans anticipate. To ensure that our organizations are resilient enough to deal with this complexity, we don’t need to plan for *the* future – we need to plan for a range of possible futures.

Such reports usually go on to discuss how humanitarian organizations can prepare their structures and staff to address those trends: increasing localization, improving accountability, retaining independence, and the need for innovation. While these are all necessary and desirable, most aid organizations have not yet come to terms with the fact that the future is, by definition, unpredictable.

We face a significant obstacle: despite the fact that forecasting the future has always been part of human culture, humans are terrible at prediction. However, it is possible for organizations to become more effective at forecasting, using techniques developed for the field of futures studies, a relatively recent discipline that appeared at the beginning of the 20th century and began to be approached systematically in the 1960s.

A range of terms describes these techniques, but they all have the same underlying goal: to provide conceptual and practical tools that can help organizations to visualize possible futures, and to base their strategic planning on those visualizations in order to ensure their own future resilience. One of the most well-known examples of this is the US Department of Defense's *Quadrennial Defense Review*, which takes a 20-year view of its defense strategy.

Unfortunately, the humanitarian sector has been slow to adopt futures studies as a useful addition to its strategic planning toolbox, despite the fact that when we use scenario planning – e.g., in disaster preparedness – we are already using some basic futures techniques. Future-casting simply extends our forecasting scenarios from years to decades, which is essential if we are to break out of the trap of short-term planning in which we are now stuck.

The publication of the reports referred to earlier – such as *Humanitarian Horizons: A Practitioners' Guide to the Future* (Feinstein International Center) and *At a Crossroads: Humanitarianism for the Next Decade* (Save the Children UK) – demonstrates that some organizations have begun to take a longer-term perspective on their development. However, it is questionable whether these reports have made a significant impact on our organizations; connecting these futures exercises with setting priorities and mobilizing resources in the present day remains a challenge.

We also face the challenge that the future is the product of many different systems interacting with each other – political, economic, social, environmental and so on – and making judgements about the future requires understanding the full range of those systems. The humanitarian sector has historically been quite insular, and has often failed to incorporate knowledge from outside the sector. Finding a way to overcome all of these obstacles to effective forecasting is clearly difficult.

King's College London has been a leader in this field through the work of Randolph Kent and his team, first with the Humanitarian Futures Programme and latterly with the Planning from the Future Initiative (a collaboration between King's, the Feinstein Center and the Humanitarian Policy Group). Most recently, the Start Network of humanitarian NGOs has worked with King's College on a workshop format that has proven to be successful at exploring possible futures of the humanitarian sector.

This format brings together internal stakeholders, in the form of senior humanitarian leaders, and external experts from a variety of backgrounds: scientists, technologists, diplomats, military officers. The work of these experts overlaps with ours, but they see the world from very different perspectives. Capturing this range of perspectives is essential, but it must be done in a setting in which participants feel comfortable talking openly about the real challenges that face them and the big ideas that inspire them.

Workshop participants are invited first to discuss future possibilities from the inside out, i.e., starting from within the sector and looking outwards at our impact, and then from the outside in, so that external experts can suggest how developments in their domain might affect the humanitarian sector. These include the end of the Westphalian system of nation states; the impending automation of jobs across the world; technological innovations in areas such as biotechnology; and, more importantly, how these trends might combine in unforeseen ways.

Some of the futures we explore might seem like science fiction – indeed, other organizations have worked successfully with fiction writers to imagine topics such as the post-antibiotic future (Infectious Futures) and digital civil liberties (Owning the Future). However, it is important to be realistic about resilience, striking a balance between opening up the discussion while grounding our forecasts in operational reality – the space in which futures work connects with strategic planning.

Some futures we cannot foresee – such as the end of the Cold War, or the global financial crisis – ‘black swan events’ which seem easy to explain with hindsight, yet cannot be predicted in advance. It is impossible to prepare our organizations for every possible future; but it is possible to prepare for a wider range of futures than we currently do.

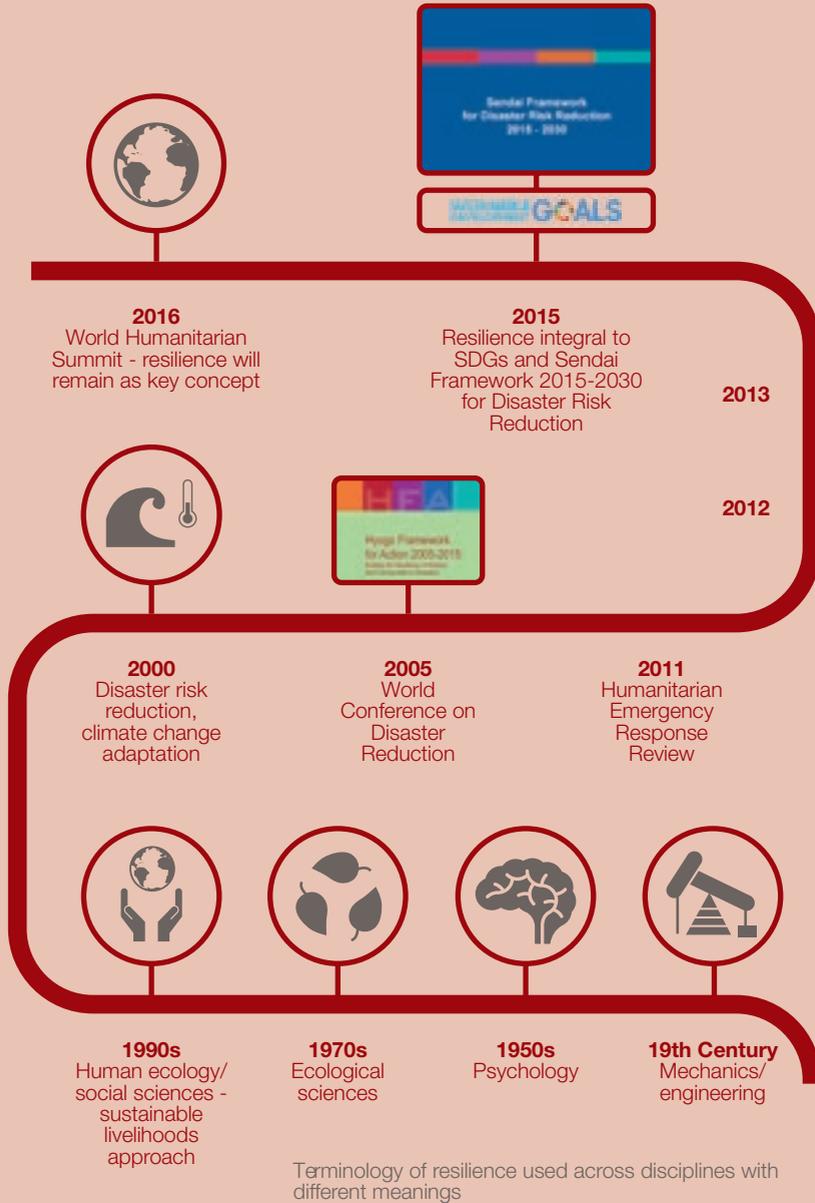
Our task is to decide which of these futures are most likely, decide what our tolerance for risk is, and build organizations to address those futures. Future-casting has become essential if we want to build humanitarian organizations that are truly resilient – which, in turn, is essential if we wish to continue to meet the needs of communities affected by disaster. ■

Developing a shared understanding of resilience

The concept of resilience has a long history and has received expansive treatment in fields such as engineering, psychology, economics, social and natural sciences. Its application in the development and humanitarian fields is a relatively recent phenomenon (see Figure 7.2). One implication is that the concept in development and humanitarian circles remains rather variably defined. Because of this, as Chapter 2 explored, measurement can be complex (OECD, 2015).

Advancements have been made in this area. In fact, there are literally dozens of frameworks that try to conceptualize and measure resilience (Bosetti et al., 2015). However, most rely heavily on a theory of change instead of on hard empirical evidence to back them up. Proposed individual factors and composite indexes tend to be inductive rather than deductively verified (Patel, 2015). The evidence is of relatively low rigour and largely based on anecdotes. Furthermore, associated interventions and validation of these factors is often circular and biased within their respective disciplines. This approach only allows insight into simple interventions for singular risks rather than to how interventions may interact with each other across sectors in addressing complex threats and enhancing resilience.

FIGURE 7.2 The rise of resilience



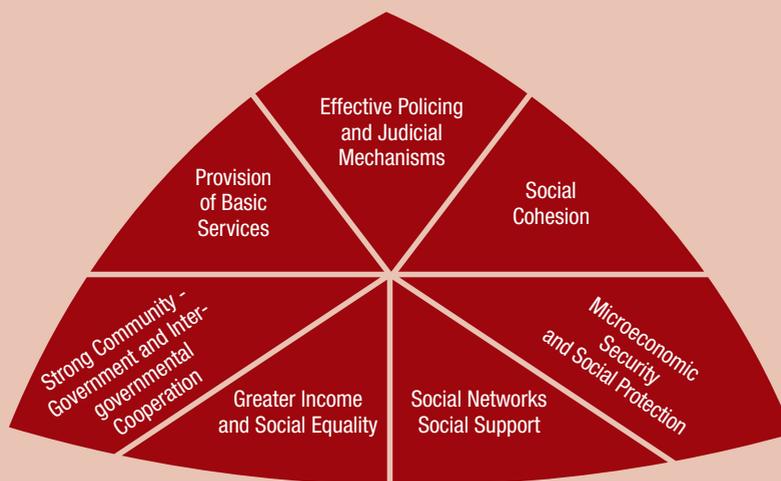
Source: Adapted from DFID's Guidance Document on Measuring Resilience, 2016

Admittedly, factors that promote resilience also tend to be hyper-contextual, and isolating universal factors is potentially misleading as it can ignore powerful context-specific processes. Recent studies have indicated how resilience is subjectively constructed, as well (Béné et al., 2016); i.e., that the perception of risk and the ability to overcome it may be as important as actual tangible factors such as income, social support systems and disaster management capacities (DFID, 2016; Béné et al., 2015). This makes arriving at a standard definition and identifying universal metrics difficult.

Nevertheless, for resilience to be a useful concept and of operational relevance to development and humanitarian actors, measurement is critical. As DFID outlined in its guidance document on measuring resilience, “If no clear guidelines exist on how to reliably and credibly measure resilience, decision-makers will not be able to make informed choices about which resilience interventions are most effective” (DFID, 2016). Efforts therefore need to be made to come to some agreement on what are the most important characteristics of resilience that can be measured universally, even if locally contextualized.

There are a number of novel approaches that have started to put forward ways of doing so. One, led by the UN University, in collaboration with Stanford University and the Igarapé Institute, has isolated seven factors that are considered to be empirically correlated with resilience in specifically fragile cities that display a particular risk for significant violence and disaster (see Figure 7.3 below). In this characterization, resilience is composed of a series of protective factors, or characteristics that strengthen capacities to withstand stresses and rebound (de Boer, 2015; Muggah et al., 2015).

FIGURE 7.3 The seven drivers of resilience



Source: Muggah et al., 2015

A central message of this framework is that building resilience requires important investments across a range of sectors. A precondition is investment in safety, well-being and risk governance. This implies, at a minimum, preventing humanitarian crises and building-in disaster response capacities. Efforts to rein in violence, promote meaningful employment and ensure access to basic services are also critical (World Bank, 2011). Other fundamental areas of investment include functional and durable infrastructure and environmental improvements. Reliable public transportation and adequate communications coverage, the existence of quality disaster management plans, social protection for vulnerable populations and risk mitigation are vital, also. Finally, the role of inclusive governance and effective leadership cannot be overlooked.

Similarly, important initiatives that set out to measure resilience at the city scale include the IFRC's *Characteristics of a Resilient Community*, the *City Resilience Index* produced by ARUP being used by the *100 Resilient Cities* initiative of the Rockefeller Foundation, as well as UN-Habitat's *City Resilience Profiling Tool*. These multiple efforts are currently complementary. They take different approaches to understanding resilience using evidence and data collection processes that are available and relevant for each context and respective purpose. Each carries its own strengths and limitations, from the inability to weight different indicators to the need for readily-accessible data or resource-intensive self-assessments. These features may create bias towards larger or more capable participating cities. Thus, individually they have limited application or accuracy for all cities. The truth is that multiple approaches will be required until the evidence base and data availability 'catch up' with these frameworks, in order to guide the selection of more universal indicators and the right indicators for the right contexts.

Moving forward, it is essential that we build on these initiatives and develop a stronger evidence base about what factors are most important and how they individually and collectively engage with risks to enable resilience. This needs to be facilitated through information sharing between actors and complemented by sustained efforts to assess resilience pre- and post-disaster, particularly in contexts where data is currently not available.

The growing variety of structured and unstructured data should put us in a better position to assess whether we are succeeding. If we continue to research collectively in identifying the factors that constitute resilience; agree on a set of indicators and metrics that enables measurement of these factors; and systematically collect data to develop baselines from which progress can be assessed, we will most certainly be in a better position to provide advice to decision-makers about which resilience interventions are most valuable.

Adopting a systematic approach to operationalize resilience

To solve challenges, effective leaders often borrow ideas and practices from around the world and work with different layers of government and actors spanning the private sector and civil society. A starting point for operationalizing resilience would be to share practices, successes and failures. Resilience encompasses multiple efforts that must be taken together and integrated. Yet, practice to date has largely followed established silos of activity divided by disciplines such as disaster preparedness, disaster risk reduction, poverty alleviation, climate-change adaptation and violence prevention. While they have each enjoyed success in addressing risks, their differences in approach are significant. As a result, there has been very little cross-fertilization between these sectors. What this means is that we don't know exactly what works and what doesn't in building resilience to the multidimensional impacts of shocks and stresses.

Some cross-cutting and fundamental principles on which humanitarian action is based will need to be carried forward to the future however, specifically issues such as social justice – discussed in part in Box 7.3 below – that become more pressing in a rapidly-urbanizing world witnessing ever-increasing migration flows.

BOX 7.3 Reframing urbanization in risk: just resilience or resilient justice?

Throughout the 'Global South', urbanization is increasingly coupled with the production of 'urban risk traps', which are not exclusively driven by but clearly worsened as a result of climate change. Such traps can be defined as the vicious cycle through which various everyday hazards and episodic but repetitive small-scale disasters not only accumulate in particular localities but also tend to grow exponentially over time (Allen et al., 2015). Just as urban poverty traps are produced through combined aspects of urban deprivation that gradually undermine the potential benefits offered by cities, so also do urban risk traps undermine the multiple efforts and investments made by the urban poor and state agencies to either cope with or mitigate risk.

The notion of resilience has been rapidly popularized in recent years. Its appeal seems to lie in its capacity to enable a particular geographical system or social group to bounce back – or even forward – after experiencing a shock. Therefore, building resilience is often taken to be synonymous with positive change. But what happens, for instance, when individuals and communities become resilient by internalizing risk as a given part of urban life, or by struggling to strengthen their capacity to act, to cope, mitigate and even prevent risks in isolation from the state and other agents of change?

Environmental justice is a useful concept to investigate more critically what the outcomes of seeking resilience are or might be, revealing the potential tensions but also synergies between the two concepts in the face of a widened and deepened process of urbanization in risk that we witness

across the Global South. Yet, equally, environmental justice needs to be interrogated to amplify its transformative capacity – both in conceptual and practical terms – to help us to address frequently-reproduced assumptions that equate ‘justice’ simply with some form of ‘redistribution’ (Fraser, 1996).

The case of Lima, the second-largest desert metropolis in the world, illustrates these points. As in many other cities across the global south, urban risk traps materialize differently in the historic centre and periphery of the city. In these areas, most local residents face poverty, marginalization and high vulnerability to everyday risks and small-scale episodic disasters. In 2015, both areas were among those subject to an emergency declaration due to the forecasted impacts of the warm phase of El Niño Southern Oscillation (ENSO). The ENSO cycle – both El Niño and La Niña – causes global changes in temperatures and rainfall, which exacerbate existing everyday risks and episodic disasters at the local level, endangering human life and well-being as well as man-made and ecological infrastructure.

In the periphery of the city, various waves of occupation have hit the slopes of the poorest and most populous districts since the end of the 1990s. Initially, this occurred through the collective occupation of land, and more recently it has continued via individual transactions, driven by the unsatisfied demand for affordable land and housing elsewhere in the city. It is a shift that benefits land traffickers and speculation on the land. These settlements, situated across areas which used to be *lomas costeras* – a unique seasonal ecosystem that covers the hills with greenery during humid periods of winter fog – form a repetitive pattern of urbanization that constantly reconfigures the edge of the city. These methods entail a backward process of urbanization, in which some form of precarious land tenure security is obtained after claiming settlement in the area and as a means of starting the quest for basic services.

Some of the most commonly-experienced hazards include rock and mudslides, the collapse of built structures, and fires caused by precarious electricity connections. There are also various gastrointestinal and respiratory diseases associated with poor insulation and the lack of access to basic services such as water and sanitation.

While most settlers are deploying individual and collective coping practices to claim a place within the city, others become willingly – or unwillingly – engaged in different forms of speculation motivated by the expectation of capturing a small surplus by carving further plots on the slopes. In parallel, other practices of speculation on a larger scale operate on the edge of the settlements, driven by organized networks of land traffickers. This complex web of land acquisition is driving the expansion of the city in the gaps between the legal and the illegal, the formal and the informal.

A clear contradiction is found in this area: while it houses a low-income population and relatively small investments are made to occupy a plot of land, these investments multiply with time, as settlers face high costs in order to make the steep slopes habitable. These costs include the investments incurred to attain some form of tenure security, gain access to potable water, improve accessibility and mobility, and cope with the multiple everyday risks produced by the very effort to occupy the slopes. As a result, small-scale disasters tend to accumulate and intensify over time, exacerbating the challenges faced by already impoverished and marginalized women and men, and pushing them further into ‘risk traps’ which cannot be broken through individual efforts.

External and community-led investments to make both areas and their inhabitants resilient to shocks tend paradoxically to deepen urban risk traps. In the periphery, the bulk of public funding goes to building further pathways and staircases to improve the mobility of the local residents. However, such investments have propelled a process of vertical urbanization higher up the slopes, where newcomers trigger further rockslides in their efforts to carve a plot, and face exponentially more difficult and costly investments in order to access basic services.

Furthermore, efforts to address the rampant maldistribution of risk experienced by both established settlers and newcomers are deeply undermined by their misrecognition and often stigmatization. Perceived as an undifferentiated group of land traffickers or as undeserving occupants of the land means that, usually, local dwellers are not entitled to benefit from public investments, but are instead reached by random, discretionary interventions.

Seeking urban resilience does not necessarily need to lead to unjust outcomes, but unless both notions and their interrelation are thoroughly scrutinized in the way we understand and seek to act upon risk, urbanization in risk is likely to remain a reality for many city dwellers, now and into the future. ■

Emerging practice is starting to tell an important story about the need for cross-fertilization in practice and knowledge. When it comes to reducing violence in cities, for example, the most far-reaching and sustainable strategy involves purposefully investing in inclusive public spaces, social cohesion, and mobility. While the prevailing approach to addressing urban violence is often concerned with the tendency to 'secure' cities, evidence is increasingly pointing to the fact that addressing socio-economic factors that give rise to violence – such as youth unemployment, inequality and the lack of access to basic services – are starting to show dividends.

Take, for instance, the cases of Bogotá, Colombia, which achieved a 70 per cent decline in homicidal violence between 1995 and 2013; and its sister city Medellín, which experienced an even more dramatic 85 per cent decline in murder rates between 2002 and 2014. These declines were made possible and sustainable through efforts to 'design-out crime' by a series of investments that addressed social, economic and political inequalities (Muggah and Szabó de Carvalho, 2016). These same practices have also been linked to effective conflict resolution and prevention efforts.

In addition, there is a growing body of evidence documenting the role that protective factors can play to enhance the resilience of vulnerable urban populations in the contexts of violence, disaster or extreme poverty (Muggah, 2012). Youth risk reduction programmes that aim to stimulate income opportunities for young people through job training, cash transfer schemes, micro-enterprise development and the provision of child care have produced positive results in terms of addressing poverty, reducing violence and enhancing coping strategies in times of disaster (de Boer in Sanderson et al., 2016).

Cities such as Nairobi and Johannesburg have also experimented with market-based approaches to target the urban poor by providing low-interest loans, tax rebates and grants to upgrade slums and rehabilitate houses and attract businesses to revive disaster-struck slum communities. Loans to upgrade slum infrastructure, as exemplified in Ahmedabad, can mitigate the chronic vulnerability that the poor face. In the future, it is likely that a key element of humanitarian response will be about supporting small businesses to respond to humanitarian crises by helping them provide essential goods in the short term and revitalizing local economies over the long term. Ideas such as extending critical disaster-recovery loans and micro-insurance to small and informal businesses to expedite small dollar-amount disbursements are examples that could be scaled up. These would mitigate the risk of inflation caused by cash-only interventions meant to spur demand by supporting the supply side of the equation. Resilience is furthered when such interventions are implemented before crises, to mitigate disaster impacts and enable faster recovery.

Emerging research has demonstrated, also, how cash-based approaches (see Box 7.4 below) and the deployment of more targeted social safety nets and financial protection schemes enables individuals, families, communities and markets to recover from disaster more quickly (Doocy and Tappis, 2016). This systematic review of the evidence base, commissioned by DFID, indicated that cash transfers can prevent the deterioration of household food security and even improve it. Furthermore, the study showed that cash transfers are cost efficient, cost effective and have positive economic multiplier effects that benefit the local economy over the short and long term.

These findings complement the conclusions of the independent *High-Level Panel on Humanitarian Cash Transfers* and the UN Secretary-General's *High Level Panel on Humanitarian Financing*. In view of this emerging evidence, cash-based assistance is likely to be accelerated further. Initiatives like Helperbit, a web-based platform that uses Blockchain technology to send money using Bit-coins, could push practice even more and revolutionize the way that money is donated directly to people affected by crises in extremely rapid, transparent and cost-effective ways.

Yet, the scaling-up of cash-based approaches needs to take into consideration the associated risks. If not adequately planned, cash-based assistance can cause disruption in the business supply chain; it can contribute to inflation and even link to a rise in gender-based violence (IRC, 2015). In addition, the injection of cash to meet immediate needs should not distract local authorities and external actors from investing in disaster preparedness and prevention.

The future is promising; however, many of the examples given above lack systematic evidence on how they protect against various risks or complement other approaches to achieving effectiveness in different environments. To do so, a sustained and coordinated investment in knowledge must take place among development and humanitarian communities in an interconnected way.

BOX 7.4 Cash transfers and resilience: what does the future look like?

Cash transfers, including cash and vouchers, have the power to contribute to large-scale diverse needs and protection, and economic recovery in a way that in-kind transfers do not. In light of their much greater flexibility and capacity to empower, they are a particularly well-suited tool for promoting resilience. In his report in preparation for the World Humanitarian Summit, the UN Secretary-General stated that “where markets and operational contexts permit, cash-based programming should be the preferred and default method of support” (UN, 2016). Affected persons can use cash transfers to meet a range of basic needs, restock livelihoods assets or save for future emergencies as their particular situation requires. Cash and vouchers also support local markets as they are spent with local merchants, as opposed to in-kind assistance that is often sourced from outside affected communities. This is especially important in urban settings. In the case of displaced and refugee populations, local spending can help to ease tensions with host communities who may see newcomers as an economic burden. In response to the many assumptions and fears regarding cash, ranging from inflation to use by affected persons, cash has prompted humanitarian agencies and donors to consider markets, situation and response analyses more systematically and critically. Affected persons’ preferences and access are factored into reword choice, and cash fundamentally shifts the power of decision-making from aid agencies to crisis-affected people.

What does the future look like for cash transfers?

Cash that can be used as affected communities see fit, called unrestricted or multi-purpose cash, is the most flexible form of humanitarian assistance currently available (World Bank, 2016). It may be delivered through a card, a mobile phone or directly in an envelope, but technology is increasingly being leveraged to provide affected persons with ‘smart’ cards (a plastic card with an embedded chip containing information on the recipient and the benefits to which they are entitled) that help minimize fraud and loss. Cash transfers, and unrestricted cash in particular, also enable feelings of normalcy and dignity in the face of huge upheaval in people’s lives. For people with specific needs, such as those with disabilities or diverse sexual orientation or gender identity, cash may be more accessible and discreet than in-kind distributions. Cash has been and will continue to be used as part of protection programming, as it has been shown to help reduce child labour and to contribute to the prevention and mitigation of gender-based violence, amongst other outcomes (IRC, 2015).

The *2015 Report of the High-Level Panel on Humanitarian Cash Transfers*, an expert panel comprising academics, European donors, the private sector, and NGOs, highlighted the need to “leverage cash transfers to link humanitarian assistance to longer-term development and social protection systems, capitalize on the private sector’s expertise in delivering payments and, where possible, deliver cash digitally and in a manner that furthers financial inclusion” (ODI, 2015). Cash transfers provide a natural link to the private sector, as financial and mobile-phone service providers are increasingly used as the delivery arm of humanitarian cash transfers. This provides a clear opportunity for financial inclusion of refugees and internally-displaced persons, as well as previously marginalized or vulnerable host communities and other crisis-affected populations. Cash transfers can help facilitate individual financial inclusion, and humanitarian agencies can leverage private-sector delivery capacity, retail outlets and agents, and innovations to improve the efficiency, reach and accuracy of cash assistance delivery.

Linkages to government cash-based social protection systems are increasingly relevant in large-scale, protracted crises. National systems can provide stable support for internally displaced persons and refugees during displacement or local integration, and can provide longer-term support for the most vulnerable in a way that humanitarian assistance cannot. In Turkey, which currently hosts more than 2 million Syrian refugees, the government is planning to incorporate Syrians into their national social safety net system. This should help in preventing the downward spiral into poverty that has been documented in Jordan and Lebanon; a report by The World Bank and The UN Refugee Agency (UNHCR) found that 88 per cent of Syrian refugees in Jordan were poor at the time of the report or expected to be poor in the future, and that refugees' poverty increased between 2013 and 2015 (Verme et al, 2016).

Sadly, given the scale and longevity of the Syrian crisis, humanitarian cash transfers and other forms of assistance represent only a modest contribution to the needs of refugees. The report recommends, indeed, that humanitarian assistance be coupled with a longer-term area-based development approach, or "economic growth in the areas hosting [refugees], so that refugees and local communities can share in economic progress". Refugees must also have access to the labour market and to government services if they are to have any chance of returning to self-reliance (World Bank, 2016). The future of humanitarian cash transfers will not only see an increase in their scale, scope and regularity but will also necessarily involve their link with policy and advocacy interventions to ensure access to markets and jobs.

A recent study in the West African Sahel found that governments were keen to scale up their national social safety net systems, and humanitarian actors were well placed to share their expertise in using cash transfers to respond to food and nutrition insecurity (Cherrier, 2014). Government social safety net systems include regular payments to the most vulnerable individuals and households, to ensure their access to basic goods and services and to cushion against future shocks. If humanitarian expertise is leveraged to support capacity-building of national systems, there is potential for sustainable social transfer programmes that can respond to both seasonal shocks and the longer-term needs of the most vulnerable. These crises may fade from international focus in the face of conflict-related displacement, but climate change causes seasonal and recurrent crises that will require similarly large-scale, government-supported responses in order to build preparedness and resilience. Cash transfers as part of social safety nets are one important piece of this response.

As protracted displacement and increased migration of all forms continues to be the reality in 2016 and beyond, multi-purpose cash transfers can link humanitarian assistance to social safety net systems, financial services and area-based economic recovery. These approaches can contribute to the resilience of refugee and internally displaced persons as well as host communities. Knowing that return to their homes may be a future within five years or more, resilience for those displaced will mean the ability to rebuild their lives in a new place and respond to urgent needs while maintaining dignity and hope. Humanitarian agencies must aim for these goals, in strong partnership with affected communities. ■

Improving our ability to understand disasters

Our capacity to help build resilience to disaster among affected populations also depends on the ability to understand how disasters are likely to evolve. Situations on the ground often change rapidly in the context of crisis. The current approach to assessing needs, which often takes days, can be rendered irrelevant quickly. This can

lead to ineffective responses and cost lives. Quality data (across the full spectrum of disasters – rapid onset and chronic, large and small) is essential for effective disaster response and to ensure that promoting resilience is at the centre of government decision-making.

This message is being increasingly recognized around the world. For instance, the Australian Business Roundtable for Disaster Resilience and Safer Communities recently set up an Open Platform for Natural Disaster Resilience Decisions. The objective of this platform is to promote a long-term commitment to resilience in Australia based on a comprehensive and coordinated approach to collecting data and promoting research on the impact of disasters triggered by natural hazards (Deloitte, 2014).

Open-data initiatives that can help authorities to monitor and evaluate whether interventions are also showing promise. MapAction's work is an example representing the emergence of ICT as a core skill required for humanitarian response. Social media-based platforms (such as the US Geological Survey's Twitter Earthquake Detector) and crowdsourcing data collection techniques are other powerful sources that could help us move from reaction to early warning. The rapidly growing field of sensor technology applied to urban infrastructure to measure the number of persons crossing a bridge by vibration, for example, will allow for real-time information and rapid response. The role that Cloud Computing and the Internet of Things can play in supporting a dynamic and common crisis information management system for decision-makers and communities should not be underestimated, either (Lin et al., 2014). The use of remote sensing and wearable sensors could also enable us to see patterns in real-time and speed up response. As technological advances are realized, interactive platforms will enable instant communication and coordination between citizens, leaders and relief organizations. This is of tremendous value when it comes to understanding how disasters are unfolding in near real-time.

As disasters become increasingly complex and interconnected, crises analysis tools such as the 'Hazer Gazer' in Indonesia, which combines multiple data points with videos from citizen journalists, will be required to provide disaster management authorities with a multidimensional, near real-time sense of the situation on the ground. Premise – another promising technology that uses machine learning to make sense of millions of mobile-phone photos captured daily by their global network of contributors – could emerge as an effective tool also, to help us better understand the complexity and interconnected nature of disasters. The potential of real-time and integrated information for shaping more effective planning is high. Doing so will enable residents and governments to be able to access real-time data and information in a way that facilitates good decision-making in the context of crises. Examples of the power of such platforms are increasingly visible.

As time moves on, these kinds of platforms are likely to expand and develop functions that will help humanitarian actors better understand how the disaster is unfolding. Yet, despite all of these technological advances, a key factor in determining the utility of more accurate information on how disasters unfold will be the ability of information providers and researchers to integrate their data and knowledge into existing data streams that support decision-making. This is easier said than done. However, there are promising developments emerging and the recently announced UN Humanitarian Data Centre in The Hague could be one place where such integration happens. These efforts will also help the humanitarian community improve its track record on engaging communities affected by disasters (ALNAP, 2015).

Access to real-time information also comes with potential drawbacks and dangers, however. Real-time information tracking can be abused. For example, if it becomes possible to follow troop movement or migration patterns in real-time, there is a likelihood that this data could be used irresponsibly. Ethics in humanitarian innovation is a serious issue (Blunt, 2015). Preventing the abuse of data will require clear and agreed-to protocols on data collection, storage and use. OCHA (2016) has identified some of the critical issues humanitarians are likely to encounter as they use data to support effective response. Proposals include developing a doctrine for consent from actors, a risk-management framework for using data, as well as detailed ethical protocols governing data collection, use and storage. Overall, however, the power of enhanced data and data analysis tools will enable us to better understand and monitor the dynamic nature of future crises with potentially revolutionary impact for improving humanitarian response and building resilience.

When it comes to protecting our assets and infrastructure, there are a number of promising developments that will enhance resilience. Examples include smart infrastructure (electrical grids, water, telecommunication, banking and finance systems) with an embedded capacity to adapt and reconfigure in times of disaster. Companies such as Siemens, ARUP and RPA are already making some important breakthroughs in that area. Their research has demonstrated how technology can redirect critical infrastructure such as energy, water and emergency services to those most in need in a matter of minutes in the context of extreme weather-related events. This form of networked infrastructure that can send and receive information allows a more rapid active disaster response system.

We are also beginning to see the growing role that the insurance industry can play in terms of developing risk assessment tools and deploying insurance and reinsurance schemes, as well as impact bonds that enable quick response pre-and post-disaster. The African Reinsurance Corporation, the Turkish Catastrophic Insurance Pool and its copies are examples of the private sector playing a growing role in disaster response, recovery and resilience building. The launching of the first insurance scheme for pandemic risk by The World Bank builds on these lessons as it aims to enable funds to be released quickly once a certain number of parametric triggers are met, based on the

size, severity and spread of a health outbreak. What is evident is that, by 2025, technology will be an integral component of our ability to understand, respond to and potentially prevent disasters from happening.

BOX 7.5 An urban future and smart technologies

Cities are important drivers of growth and development, providing jobs, infrastructure and services. With unplanned expansion, the growing number of people, assets and economic activities increase the exposure of cities to the impacts of disasters and climate change. A major part of all losses resulting from disasters reported in Latin America are in urban areas. Densely-inhabited coastal settlements are at particular risk: a study quantifying the present and future flood losses in 136 of the largest coastal cities estimates that by 2050, they could be facing flood losses amounting to US\$ 52 billion (Hallegatte et al., 2016). Climate change can exacerbate these risks.

Rapid change is also being matched with rapid advances in smart technologies. These are set to play a vital role in the future of cities. Big data and the Internet of Things (IoT) are buzzwords of the decade but the principle of using information for increasing operational effectiveness or communications flows has been at the core of risk management for many years. Many cities are investing in 'digital' or 'smart' technologies to improve their planning and asset management, both of which can help increase their resilience. For example, in Singapore, a network of sensors, cameras and GPS devices in taxi cabs tracks traffic, predicts congestion and alerts drivers to alternative routes. In New York, USA, the Hudson's Yard area is being developed with data network, broadband and WiFi connection, sensors and high-speed fibre optics built into the foundations to improve quality of life by monitoring air quality, traffic flows and emissions, increase the efficiency of utilities, and guide traffic as well as emergency evacuation. For the urbanizing world, lessons learnt provide valuable opportunities to introduce leapfrog technologies supporting smarter and safer development.

The advanced ability to collect and process data provides many opportunities to improve capabilities to predict, prepare for and respond to disasters (Petersen et al, 2014). For example, smartphone-collected big data has the potential to transform weather forecasting and early-warning systems. Models which contain barometers, hygrometers, ambient thermometers and even light meters can produce meteorological data that can form part of a granular network of millions of interconnected weather stations (Jha et al., 2015). South Korea has invested in upgrading its national weather information system to better predict weather patterns and the impact of specific events. Installation of big data processing technology, which, in combination with a system of sensors and satellites, dramatically improved the accuracy of forecasts, potentially saving thousands of lives and damage to assets (Hamm, 2013). Drones are being tested in many situations also (Straits Times, 2016), e.g., to help monitor construction sites or water usage and infrastructure, survey insect-breeding sites to fight diseases, map assets and population at risk from disasters, and also to help officials and responders assess post-disaster damages in areas difficult to access otherwise.

Social media channels and crowd-generated data can improve coverage of disaster monitoring and targeting of disaster response. The growing usage of smartphones and sensor-equipped devices enables Community Sense and Response systems with applications across various sectors to

involve communities directly. For example, the Community Seismic Network seeks to detect earthquakes and provide real-time estimates of their impact rapidly, using community-operated sensors. In Japan, mobile-phone data was used to track population displacement after the 2011 Great Eastern earthquake and tsunami and was subsequently used for decision-making in infrastructure planning and disaster management. In Haiti, after the 2010 earthquake, the Haiti Ushahidi platform, which crowd-sourced information largely from SMS texts, email, Twitter and the web, was used to estimate the structural damage in Port-au-Prince with surprisingly high accuracy (Jha et al., 2015).

Technologies can therefore be extremely helpful tools but there are risks also, and officials as well as citizens need to be 'smart' in using them in the right ways. Today, there are still many challenges in fully utilizing the potential contribution of many ICT advances, on top of financial and technological constraints. Data infrastructure and protocols are needed to ensure functionality and security of the employed tools (CitiLab, 2016). Analytical tools are needed so that the large amount of data can be processed into meaningful messages (Heaton, 2013), particularly in the context of smaller but rapidly-growing cities which might lack the capacities, systems and processes to use information effectively – whether this is disaster and climate-related risk information or 'smart' information. ■

Following the lead of local actors

Certainly, the answers are not all technical or top-down. Resilience cannot be imposed from above. Instead, it needs to be – and often is – found in the relationships that govern people's everyday lives. In many cases, individuals and communities have already developed some of these capacities through informal networks. Research has shown that some of the most resilient people and communities are those in places that have experienced deep challenges (Zolli and Healy, 2012). These capacities have developed as a result of having overcome repeated disruptions and challenges to the point where a culture of resilience has emerged through informal networks rooted in trust and the ability to learn.

As local populations represent the first and last actors in crisis response and recovery, building resilience is not the only role of international actors. Rather than leading resilience, humanitarian practice can follow the example of local communities and accompany the process. The most robust efforts for resilience have often grown out of neglect and a lack of assistance, leaving communities to devise their own resilience mechanisms. Household and community-driven resilience strategies have been found in areas with recurrent flooding, from Dhaka to multiple cities in Africa (Douglas et al., 2008).

Humanitarian actors can support locally-driven resilience efforts directly by engaging with ongoing initiatives of citizens, communities and local governments. Many aid organizations have engaged with communities in disaster risk reduction efforts through enhancing community mobilization for early-warning systems, first responder training, flood mitigation and infrastructure projects, among other activities. Community-led,

resilience-based partnerships have proven to save lives and money (Castillo and Herrera, 2013; Boonyabanha and Mitlin, 2012). Investing in grass-roots leadership, particularly women's leadership, is also essential for reducing vulnerability to disaster and building resilience to hazards (Gupta and Leung, 2010).

As humanitarian actors aim for more resilience-oriented interventions, they must actively work with other local and international organizations to prevent the very social, political and economic factors that created vulnerability in the first place. Local communities, power structures and governments may have their own pre-existing inherent problems that drive social exclusion, inequality and risk. These locally-driven processes have the power to empower and disempower (Allen, 2006; Olwig, 2012). Yet, there is no universal formula for taking these into account. Analysis of the existing power structures must be well informed and practice must use good judgement when activating local processes for humanitarian response.

Resilience is now a key element of the 2030 Agenda for Sustainable Development, the Sendai Framework and, as was committed to at the World Humanitarian Summit, is set to be an enduring part of the humanitarian agenda moving forward.

Nevertheless, the best humanitarian solution continues to be a political one. At the 2015 UN Conference on Climate Change – COP21 – held in Paris at the end of 2015, governments committed to tackle climate change aggressively. As the UN Secretary-General's High-Level Independent Panel on Peace Operations emphasized, in the absence of a political agreement wars in Syria, Yemen, Ukraine, Mali and South Sudan will not end and efforts to protect civilians and enforce the rules of war will continue to face obstacles. Political solutions are also required to deal with the migration crisis that has gripped the world. Resilience-based approaches and innovative technologies will improve our ability to anticipate, respond to and recover from crises. However, without political leadership these efforts and innovations will be rendered partial at best.

Chapter 7 was written by John de Boer, Senior Policy Advisor, UN University, Tokyo, Japan, and Ronak Patel, Assistant Professor at Stanford University, California, USA. Box 7.1 was written by Bernard Manyena, Programme Director International Disaster Management, Humanitarian and Conflict Response Institute, University of Manchester, UK; Box 7.2 by Paul Currian, Lead Consultant at humanitarian, Belgrade, Serbia; Box 7.3 by Adriana Allen, Professor of Development Planning and Urban Sustainability at The Bartlett Development Planning Unit, University College London, UK; Box 7.4 by Joanna Friedman, Cash and Protection Advisor, UNHCR, Geneva, Switzerland; and Box 7.5 by Abhas Jha, Practice Manager, and Zuzana Stanton-Geddes, Operations Analyst for Urban Development and Disaster Risk Management for East Asia and the Pacific at the Social, Urban, Rural and Resilience Global Practice, The World Bank, Washington DC, USA.

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Disclaimer

The data and opinions expressed in this annex do not necessarily represent the official policy of the International Federation of Red Cross and Red Crescent Societies (IFRC) nor of individual National Red Cross or Red Crescent Societies. For further information regarding the figures, data and analysis provided, please contact the Centre for Research on the Epidemiology of Disasters (CRED).

Rwanda. Gisagara District. 5 April 2016. Rwanda Red Cross food security programme. Rural residents tend to a community garden. Distribution of seeds along with training on crop management are aimed at improving resilience to food insecurity in vulnerable areas.
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Disaster data

According to the Centre for Research on the Epidemiology of Disasters (CRED), 371 disasters triggered by natural hazards and 203 triggered by technological hazards (typified hereafter with the abbreviations DTNH and DTTH, respectively) were reported worldwide in 2015.

The number of DTNH was the fourth highest of the decade, close to its decade's annual average (375), and the number of DTTH the third lowest of the decade, 13 per cent below its decade's annual average (234).

Floods remain the most frequent DTNH, but in 2015 their number (154) was 10 per cent below their decade's annual average (172). With 114 disasters, storms were in second position, but this number was the highest of the decade, at 18 per cent above its decade's annual average (97). The number of 33 disasters triggered by droughts was the highest of the decade also, being 38 per cent above its decade's annual average (24).



Nepal, Sindhupalchok district, Melamchi village, May 2015. Children participate in planting flowers at the field hospital site as part of psychosocial support services. The Japanese Red Cross health team set up a field hospital following the 25 April earthquake to support the Melamchi primary healthcare centre. The centre provides basic healthcare services, psychosocial support and community hygiene promotion.
© Ly Nguyen

The number of deaths caused by DTNH (22,724) is the fifth highest of the decade but remains 67 per cent below its annual average (69,808), very far ahead from the peaks of 2008 (242,215 deaths) and 2010 (314,503 deaths).

The deadliest DTNH of 2015 was an earthquake which hit Nepal in April and killed 8,831 people, a death toll very far from the number of deaths caused for instance by cyclone Nargis in Myanmar in 2008 (138,375 deaths). Three heat waves in France, India and Pakistan caused 3,275, 2,248 and 1,229 deaths, respectively. These major DTNH, which killed thousands of people (totalling 15,583), accounted for 69 per cent of all deaths from DTNH.

Deaths from floods (3,408) and storms (1,260) were both the lowest of the decade, far below their decade's annual averages of 5,703 and 17,370, respectively.

The number of people killed by DTTH (9,826) was the second highest of the decade, and is 33 per cent above its decade's annual average (7,383). The event which resulted in the highest number of deaths (2,236) was a stampede during the Hajj pilgrimage in Saudi Arabia. Fifty-five per cent of deaths from DTTH were related to transport accidents, with shipwrecks accounting for 65 per cent of these deaths and road accidents for 24 per cent.

In 2015, the number of people reported affected by DTNH was the second lowest of the decade while, in contrast, the number of people reported affected by DTTH was the third highest of the decade.

The number of people reported affected by DTNH (108 million) was far below the peaks of 2010 (343 million) and 2011 (264 million). In 2015, 49 per cent of people reported affected were victims of droughts; 32 per cent suffered from floods; and 10 per cent from storms. The most severe DTNH was a drought which affected 18 million people in North Korea between June and July. A flood in India in July and August affected almost 14 million people, while another drought in Ethiopia affected 10 million people. Nineteen other DTNH each affected at least 1 million people: 10 droughts for a total of 21 million people affected, 4 floods for a total of 14 million, 4 storms for a total of 8 million and 1 earthquake which affected almost 6 million people. The total of people affected by all these major DTNH represents 84 per cent of all people affected by such disasters.

Compared to DTNH, DTTH affect, proportionally, very few people. In 2015, the number of people affected by miscellaneous accidents (71,620) was the highest of the decade and was almost totally attributable to fires, which affected a total of 69,057 people. The largest fire occurred in a slum area of Manila, the Philippines, and affected 50,000 people. Industrial accidents affected a total of 25,266 people, with 12,017 people affected by an oil spill in Guatemala; 8,234 by a gas leak in the

USA; and 3,136 by the explosion of an ammunition depot in Ukraine. A total of 5,076 persons was reported affected by transport accidents.

In 2015, DTNH cost US\$ 70.3 billion, the third lowest amount of the decade, which is 50 per cent below the decade's annual average. The earthquakes in Nepal cost US\$ 5.2 billion, while 22 other DTNH (10 storms, 7 floods, 3 droughts and 2 wild fires) cost between US\$ 1.0 to US\$ 4.2 billion for a total of almost US\$ 39 billion. All these DTNH accounted for 62 per cent of the total reported damages.

The only DTTH for which estimated damages are actually available is the shipwreck of a passenger ship in the Yangtze River, which cost US\$ 15 million.

EM-DAT: a specialized disaster database

Tables 1–13 on disasters triggered by natural and technological hazards (typified hereafter with the abbreviations DTNH and DTTH) and their human impact over the past decade were drawn and documented from CRED's EM-DAT: International Disasters Database (www.emdat.be). Established in 1973 as a non-profit institution, CRED is based at the School of Public Health of the Catholic University of Louvain in Belgium and became a World Health Organization (WHO) collaborating centre in 1980. Although CRED's main focus is on public health, it also studies the socio-economic and long-term effects of large-scale disasters.

Since 1988, CRED has maintained EM-DAT, a worldwide database on disasters. It contains essential core data on the occurrence and effects of more than 22,000 DTNH and DTTH in the world from 1900 to the present. In 1999, a collaboration between the United States Agency for International Development's Office of Foreign Disaster Assistance (USAID/OFDA) and CRED was initiated.

The database is compiled from various sources, including United Nations (UN) agencies, non-governmental organizations, insurance companies, research institutes and press agencies. Priority is given to data from UN agencies, followed by OFDA, governments and IFRC. This prioritization is not a reflection of the quality or value of the data but the recognition that most reporting sources do not cover all disasters or may have political limitations that could affect the figures. The entries are constantly reviewed for redundancies, inconsistencies and the completion of missing data. CRED consolidates and updates data on a daily basis. A further check is made at monthly intervals. Revisions are made annually at the end of the calendar year.

The database's main objectives are to assist humanitarian action at both national and international levels; to rationalize decision-making for disaster preparedness; and to provide an objective basis for vulnerability assessment and priority setting.

Data definitions and methodology

CRED defines a disaster as “a situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance (definition considered in EM-DAT); an unforeseen and often sudden event that causes great damage, destruction and human suffering”.

For a disaster to be entered into the database, at least one of the following criteria must be fulfilled:

- ten or more people reported killed
- 100 people or more reported affected
- declaration of a state of emergency
- call for international assistance.

The number of people killed includes people confirmed as dead and people missing and presumed dead. People affected are those requiring immediate assistance during a period of emergency (i.e., requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance). People reported injured or homeless are aggregated with those reported affected to produce a ‘total number of people affected’.

The economic impact of a disaster usually consists of direct consequences on the local economy (e.g., damage to infrastructure, crops, housing) and indirect consequences (e.g., loss of revenues, unemployment, market destabilization). In EM-DAT, the registered figure corresponds to the damage value at the moment of the event and usually only to the direct damage, expressed in US dollars.

In 2007, a new DTNH category classification was introduced in EM-DAT. This new classification was initiated by CRED and Munich Re, and brought together CRED, Munich Re, Swiss Re, the Asian Disaster Reduction Center (ADRC) and the UN Development Programme (UNDP). The goals were to create and agree on a common hierarchy and terminology for all global and regional databases on DTNH and to establish a common and agreed definition of sub-events that is simple and self-explanatory. This classification was a first step in the development of a standardized international classification of disasters. It has been further adapted within the DATA group established by the Integrated Research on Disaster Risk (IRDR)¹ and distinguishes two generic categories for disasters (DTNH and DTTH). DTNH are divided into six sub-groups, which are defined, as follows, according to main types of natural hazard triggers:

- **Biological:** Insect infestation, epidemic and animal accident (the two last categories are not included in the World Disasters Report)
- **Geophysical:** Earthquake, volcanic activity and dry-mass movement (geophysical origin)
- **Climatological:** Drought (with associated food insecurities), glacial lake outburst and wild fire
- **Hydrological:** Flood, landslide (hydrological origin) and wave action
- **Meteorological disasters:** Extreme temperature, fog and storm
- **Extraterrestrial:** Impact, Space weather (this sub-group is not included in the World Disaster Report).

DTTH remained unchanged and comprise three groups of hazard triggers:

- **Industrial:** Chemical spill, collapse of industrial infrastructure, explosion, fire, gas leak, poisoning and radiation
- **Transport:** Transportation by air, rail, road or water
- **Miscellaneous:** Collapse of domestic or non-industrial structure, explosion and fire.

In Tables 1–13, ‘disasters’ refer to disasters with a natural and technological trigger only, and do not include wars, conflict-related famines, diseases or epidemics.

The classification of countries as ‘very high’, ‘high’, ‘medium’ or ‘low human development’ is based on UNDP’s 2015 Human Development Index (HDI). It should be noted that, compared to its previous version, the 2015 HDI rankings did change for several countries. For a small number of countries, which do not appear in the HDI, the World Bank’s classification of economies by each country’s level of income is used as reference (‘high’, ‘upper middle’, ‘lower middle’ and ‘low’).

In both EM-DAT and the tables in this annex, data is considered at the country level for many reasons, including the fact that it is at this level that such data is reported most of the time and also due to issues regarding possible aggregation and disaggregation of data. For droughts or food insecurities, which are often multi-year events, their impact over time is taken into account.

Bearing in mind that data on deaths and economic damage from drought is infrequently reported, CRED has adopted the following rules as regards data for droughts:

- the total number of deaths reported for a drought is divided by the number of years for which the drought persists. The resulting number is registered for each year of the drought’s duration

- the same calculation is used when reporting economic damages
- for the total number of people reported to be affected, CRED considers that the same number is affected for each year that the disaster persists.

Some disasters begin at the end of a year and may last some weeks or months into the following year. In such cases, CRED has adopted the following rules:

- with regard to the number of people reported as being affected, the total number is recorded for both the start year and the end year
- for the number of people reported as killed, CRED distinguishes between sudden-onset disasters (earthquakes, flash floods, landslides, etc.) and slow-onset disasters (wild fires, some floods, extreme temperatures, etc.) as follows:
 - sudden-onset disasters: All those killed are registered according to ‘start year’ of the disaster.
 - slow-onset disasters: The total of all those killed is divided by two, and one-half is attributed to each year of persistence.
- reported economic damages are always attributed to the end year of the disaster. This is because damage is related to both the strength of a disaster and its duration.

By using these rules, some data bias correction is attempted. However, they are far from perfect and CRED will try to improve them, as well as the database as a whole, in the future.

Caveats

Key problems with disaster data include the lack of standardized collection methodologies and definitions. The original information, collected from a variety of public sources, is not specifically gathered for statistical purposes. So, even when the compilation applies strict definitions for disaster events and parameters, the original suppliers of information may not. In addition, data is not always complete for each disaster. The quality of completion may vary according to the type of disaster (e.g., the number of people affected by transport accidents is rarely reported) or its country of occurrence.

Data on deaths is usually available because they are an immediate proxy for the severity of the disaster. However, the numbers put forward immediately after a disaster may sometimes be seriously revised, occasionally several months later.

Data on the number of people affected by a disaster can provide some of the most potentially useful figures, for planning both disaster preparedness and response,

but is sometimes poorly reported. Also, the definition of people affected remains open to interpretation, political or otherwise. Even in the absence of manipulation, data may be extrapolated from old census information, with assumptions being made about percentages of an area's population affected.

Data can also be skewed because of the rationale behind data gathering. Reinsurance companies, for instance, systematically gather data on disaster occurrence in order to assess insurance risk, but with a priority in areas of the world where disaster insurance is widespread. Their data may therefore miss out poor, disaster-affected regions where insurance is unaffordable or unavailable.

For DTNH over the past decade, data on deaths is missing or undocumented for 20 per cent of reported disasters; data on people affected is missing for 27 per cent of disasters; and data on economic damages is missing for 80 per cent of disasters. The figures should therefore be regarded as indicative. Relative changes and trends are more useful to look at than absolute, isolated figures.

Dates can be a source of ambiguity. For example, a declared date for a famine is both necessary and meaningless – a famine does not occur on a single day. In such cases, the date the appropriate body declares an official emergency has been used. Changes in national boundaries cause ambiguities in the data too, and may make long-term trend analysis more complicated.

However, in some cases, available data may differ greatly according to sources, be more or less documented estimations and/or subject to controversies. In these cases, CRED always compiles all available data or analysis to try to make its own documented estimation, which can be revised when more accurate data is provided.

Information systems have improved vastly in the past 30 years and statistical data is now more easily available, intensified by an increasing sensitivity to disaster occurrence and consequences. Nevertheless, there are still discrepancies. An analysis of quality and accuracy of disaster data, performed by CRED in 2002, showed that occasionally, for the same disaster, differences of more than 20 per cent may exist between the quantitative data reported by the three major databases – EM-DAT (CRED), NatCat (Munich Re) and Sigma (Swiss Re).

Despite efforts to verify and review data, the quality of disaster databases can only be as good as the reporting system employed. This, combined with the different aims of the major disaster databases (risk and economic risk analyses for reinsurance companies, development agenda for CRED), may explain differences between data provided for some disasters. However, in spite of these differences, the overall trends indicated by the three databases remain similar.

The lack of systematization and standardization of data collection is a major weakness when it comes to long-term planning. Fortunately, due to increased pressures

for accountability from various sources, many donors and development agencies have started paying attention to data collection and its methodologies.

Part of the solution to this data problem lies in retrospective analysis. Data is most often publicly quoted and reported during a disaster event, but it is only long after the event, once the relief operation is over, that estimates of damage and death can be verified. Some data gatherers, like CRED, revisit the data; this accounts for retrospective annual disaster figures changing one, two and sometimes even three years after the event.

The Annex was written by Philippe Hoyois, Senior Research Fellow with CRED, Regina Below, Manager of CRED's EM-DAT disaster database, and Debarati Guha-Sapir, Director of CRED.

TABLE 1 Total number of reported disasters,¹ by continent and by year (2006–2015)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total ²
Africa	202	184	173	156	135	165	124	115	101	116	1,471
Americas	105	133	143	115	146	131	114	106	116	124	1,233
Asia	308	262	240	233	253	235	210	228	228	240	2,437
Europe	98	104	58	75	99	49	91	69	80	70	793
Oceania	18	11	13	19	18	15	14	12	12	24	156
Very high human development ²	124	118	104	99	113	94	119	123	112	113	1,119
High human development	202	224	193	183	213	159	165	155	192	183	1,869
Medium human development	199	158	170	154	161	165	126	130	126	146	1,535
Low human development	206	194	160	162	164	177	143	122	107	132	1,567
Total	731	694	627	598	651	595	553	530	537	574	6,090

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ In Tables 1–13, 'disasters' refer to those with a natural and/or technological trigger only, and do not include wars, conflict-related famines, diseases or epidemics.

² See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex.

³ Since slow-onset disasters can affect the same country for a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the data definitions and methodology section in the introduction to this annex).

Note: Some totals in the table may not correspond due to rounding.

With 574 disasters reported, 2015 is the year of the decade with the fourth lowest number of disasters, very far below the peak of 2006.

Among continents, the number of disasters was the third lowest of the decade in Africa and the fourth lowest in Europe. In contrast, this number was the fourth highest of the decade in the Americas and in Asia; and Oceania suffered its highest number of disasters of the decade.

In 2015, the number of disasters was at its third lowest level in countries with low human development and at its fourth lowest in medium and high human development countries.

In countries with very high human development, the number of disasters was, in 2014, the fifth lowest in the decade.

The distribution of disasters among continents is, in 2015, very similar to the annual average for the decade.

TABLE 2 Total number of people reported killed, by continent and by year (2006-2015)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Africa	5,780	3,821	3,027	3,180	13,050	13,552	3,028	2,663	2,784	3,858	54,743
Americas	1,563	2,921	2,735	2,222	226,555	3,372	2,059	1,760	1,606	1,691	246,484
Asia	20,661	15,827	235,621	10,058	17,685	29,139	8,358	22,266	8,669	21,770	390,054
Europe	5,837	1,665	807	1,363	57,073	1,670	1,780	1,833	1,129	5,165	78,322
Oceania	24	273	25	893	140	221	433	32	201	66	2,308
Very high human development ¹	5,017	1,717	1,079	2,663	2,088	21,869	1,594	2,540	1,716	7,855	48,138
High human development	6,548	5,540	91,436	4,359	67,511	5,961	3,828	3,767	5,101	4,508	198,559
Medium human development	16,581	11,013	6,562	7,378	6,334	5,600	5,604	18,377	3,405	5,899	86,753
Low human development	5,719	6,237	143,138	3,316	238,570	14,524	4,632	3,870	4,167	14,288	438,461
Total	33,865	24,507	242,215	17,716	314,503	47,954	15,658	28,554	14,389	32,550	771,911

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex.

In 2015 the number of people reported killed was the fifth highest of the decade, but remains much lower than the 2008 and 2010 peaks. It was the third highest of the decade for Europe and the fourth highest for Asia and Africa. In contrast, it was the third lowest for the Americas and the fourth lowest for Oceania.

The number of people reported dead was the fourth lowest of the decade in countries with medium and high human development. But it was the second highest in very high human development countries and at its fourth highest in countries with a low level of human development.

In 2015, 67 per cent of people killed by disasters lived in Asia, above its decade's annual average of 50.5 per cent.

The proportion of people killed by disasters and living in Europe (15.9 per cent) is also above its decade's average of 10.1 per cent, as well as the proportion of deaths from Africa (11.9 per cent for a decade's average of 7.1 per cent).

The proportion of people killed by disasters living in Oceania (0.2 per cent) is below its decade's average of 0.3 per cent, while the proportion of people reported killed in the Americas (5.2 per cent) represents one-sixth of its decade's average (31.9 per cent).

TABLE 3 Total number of people reported as affected, by continent and by year (2006-2015), in thousands

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total ²
Africa	26,665	12,530	22,653	42,636	36,557	33,725	45,720	10,259	8,038	30,924	269,707
Americas	1,455	10,180	20,226	7,022	12,969	11,880	5,714	2,648	34,092	6,874	113,059
Asia	119,125	190,910	182,754	176,156	292,555	217,989	89,729	87,030	99,001	68,083	1,523,332
Europe	260	1,651	268	141	834	79	581	1,750	1,316	233	7,113
Oceania	38	172	105	77	549	516	263	78	170	2,379	4,347
Very high human development ¹	284	1,338	13,730	2,567	3,888	1,433	356	4,210	952	1,288	30,046
High human development	93,961	130,064	155,078	137,860	263,571	188,578	59,397	32,464	101,659	8,084	1,170,716
Medium human development	23,959	67,885	30,921	42,796	14,893	33,782	26,536	52,429	28,399	32,761	354,360
Low human development	29,339	16,155	26,277	42,811	61,111	40,396	55,717	12,662	11,606	66,360	362,434
Total	147,543	215,442	226,006	226,033	343,463	264,189	142,006	101,764	142,617	108,493	1,917,557

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex.

² Since slow-onset disasters can affect the same country a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the data definitions and methodology section in the introduction to this annex).

Note: Some totals in this table may not correspond due to rounding.

In 2015, more than 100 million people were affected by disasters, the second lowest total of the decade, far below the high levels of years 2007 to 2011 and almost half the decade's average.

In Asia, the number of people reported affected by disasters in 2015 was the lowest of the decade. It was the third lowest for Europe, the fourth lowest for the Americas and the fifth lowest for Africa.

In contrast, in Oceania, the number of people reported affected by disasters was the highest of the decade, reaching five times its decade's average.

In 2015, the number of people affected by disasters was the lowest of the decade in countries of high human development. It was the fourth lowest in very high human development countries.

On the other hand, the number of people affected by disasters was the highest of the decade in low human development countries and the fifth highest in medium human development countries.

In 2015, Asia accounted for 63 per cent of people reported as affected, below its 79 per cent decade's average, while the proportion reported for Africa was two times higher than its decennial average.

TABLE 4 Total amount of disaster estimated damage, by continent and by year (2006–2015), in millions of US dollars (2015 prices)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Africa	277	885	982	197	66	1,103	988	246	688	2,662	8,094
Americas	8,643	18,630	73,540	16,878	86,948	73,720	109,417	35,485	24,999	25,550	473,811
Asia	28,472	40,692	134,255	20,126	42,693	297,840	28,848	59,468	64,459	33,853	750,705
Europe	2,942	25,949	5,340	13,774	21,393	3,188	25,734	22,817	8,383	4,697	134,217
Oceania	1,558	1,693	2,886	1,934	10,501	30,485	909	3,316	1,181	3,523	57,987
Very high human development ¹	14,055	53,878	73,868	30,914	94,277	330,450	131,852	53,033	29,946	33,113	845,386
High human development	17,401	23,427	134,404	11,719	42,040	67,759	28,127	45,935	41,189	21,094	433,096
Medium human development	10,432	7,061	3,513	10,005	5,485	5,248	2,169	20,566	26,477	10,115	101,071
Low human development	4	3,484	5,217	271	19,801	2,878	3,748	1,799	2,097	5,962	45,261
Total	41,892	87,850	217,003	52,909	161,603	406,336	165,895	121,333	99,710	70,285	1,424,814

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex.

Note: Some totals in this table may not correspond due to rounding.

As mentioned in the introduction to this annex, damage assessment is frequently unreliable. Even for the existing data, the methodologies are not standardized and the financial coverage can vary significantly. Depending on where the disaster occurs and who reports it, estimations may vary from zero to billions of US dollars.

The total amount of damage reported in 2015 was the third lowest of the decade. Among continents, it was the third lowest in Europe, the fourth lowest in Asia and the fifth lowest in the Americas. However, it was the highest in Africa and the third highest in Oceania, where the amount of damages remained below its decade's average.

The total amount of damage was the third lowest in high human development countries and the fourth in very high human development countries.

In contrast, it was the second highest in low human development countries and the fourth highest in medium human development countries.

In 2015, the contribution of Asia to the total amount of damage was 48.2 per cent, below its 52.7 per cent average for the decade. On the other hand, Africa's contribution (3.8 per cent) was largely above its decade's average (0.6 per cent).

TABLE 5 Total number of reported disasters, by type of phenomenon and by year (2006-2015)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Droughts ²	20	13	21	31	27	24	31	13	22	33	235
Dry-mass movements ³	1	n.d.r.	3	1	n.d.r.	n.d.r.	1	1	n.d.r.	1	8
Earthquakes ⁴	24	21	23	22	24	30	29	28	26	21	248
Extreme temperatures	32	25	11	26	34	19	52	17	18	11	245
Floods ⁵	232	219	174	160	190	160	141	149	140	154	1,719
Insect infestations	1	n.d.r.	n.d.r.	1	1	1	n.d.r.	n.d.r.	n.d.r.	n.d.r.	4
Landslides	20	10	12	28	32	17	13	11	15	19	177
Storms	77	105	111	87	95	86	90	106	99	114	970
Volcanic activities	12	6	7	3	6	6	1	3	8	7	59
Wild fires	10	18	5	9	7	8	7	10	4	11	89
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	392	390	334	342	386	315	334	306	298	342	3,439
<i>Subtotal disasters triggered by geophysical hazards</i>	37	27	33	26	30	36	31	32	34	29	315
Total DTNH	429	417	367	368	416	351	365	338	332	371	3,754
Industrial accidents	64	53	38	44	36	32	25	25	28	31	376
Miscellaneous accidents	33	43	30	27	47	34	26	31	32	38	341
Transport accidents	205	181	192	159	152	178	137	136	145	134	1,619
Total DTTH	302	277	260	230	235	244	188	192	205	203	2,336
Total	731	694	627	598	651	595	553	530	537	574	6,090

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ Since slow-onset disasters can affect the same country for a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the data definitions and methodology section in the introduction to this annex).

² Includes food insecurities

³ Landslides, rockfalls, subsidence, etc. of geophysical origin

⁴ Includes tsunamis

⁵ Includes waves and surges

Notes: In this table, n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

In 2015, the number of disasters triggered by natural hazards (DTNH) was the fourth highest of the decade, while the number of those triggered by technological hazards (DTTH) the third lowest.

Among DTNH, in 2015 the numbers of those triggered by droughts and storms were the highest of the decade, and the number of those triggered by wild fires, the second highest.

On the contrary, the numbers of disasters triggered by earthquakes and extreme temperatures were the second lowest of the decade, while the number of floods, which are the most frequent trigger of disasters, was at its fourth lowest in 2015.

Among DTTH, transport accidents remain largely the most frequent but their number was, in 2015, the lowest of the decade.

TABLE 6 Total number of people reported as killed, by type of phenomenon and by year (2006-2015)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Droughts ¹	208	n.a.	6	2	10,000	10,000	n.a.	n.a.	n.a.	35	20,251
Dry-mass movements ²	11	n.d.r.	120	36	n.d.r.	n.d.r.	16	46	n.d.r.	13	242
Earthquakes ³	6,692	780	87,918	1,893	226,733	20,946	711	1,120	773	9,526	357,092
Extreme temperatures	5,104	1,044	1,608	1,212	57,064	806	1,674	1,982	1,168	7,418	79,080
Floods ⁴	5,845	8,565	4,026	3,581	8,481	6,151	3,577	9,819	3,574	3,408	57,027
Insect infestations	n.a.	n.d.r.	n.d.r.	n.a.	n.a.	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.a.
Landslides	1,638	271	504	649	3,427	309	501	235	943	1,000	9,477
Storms	4,329	6,035	140,995	3,287	1,564	3,103	3,105	8,603	1,424	1,260	173,695
Volcanic activities	5	11	16	n.a.	323	3	n.a.	n.a.	102	n.a.	460
Wild fires	16	148	86	190	166	10	22	35	16	64	753
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	17,140	16,063	147,215	8,921	80,702	20,379	8,879	20,674	7,125	13,185	340,283
<i>Subtotal disasters triggered by geophysical hazards</i>	6,708	791	88,054	1,929	227,056	20,949	727	1,166	875	9,539	357,794
Total DTNH	23,848	16,854	235,269	10,850	307,758	41,328	9,606	21,840	8,000	22,724	698,077
Industrial accidents	1,870	1,669	776	947	1,061	727	787	1,907	891	1,056	11,691
Miscellaneous accidents	1,126	909	895	911	1,507	755	1,112	1,003	646	3,322	12,186
Transport accidents	7,021	5,075	5,275	5,008	4,177	5,144	4,153	3,804	4,852	5,448	49,957
Total DTTH	10,017	7,653	6,946	6,866	6,745	6,626	6,052	6,714	6,389	9,826	73,834
Total	33,865	24,507	242,215	17,716	314,503	47,954	15,658	28,554	14,389	32,550	771,911

Source: EM-DAT, CREED, University of Louvain, Belgium

¹ Includes food insecurities

² Landslides, rockfalls, subsidence, etc. of geophysical origin

³ Includes tsunamis

⁴ Includes waves and surges

Notes: In this table, n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

In 2015, the number of deaths from DTNH was the fifth highest of the decade, but remained far below the two very high levels of 2008 and 2010.

Deaths from DTTH were at their second highest level of the decade, 33 per cent above their decennial average.

Among DTNH, the numbers of deaths from floods and storms - the most frequent DTNH - were, for a second consecutive year, the lowest of the decade, far below their decennial average. The number of deaths from extreme temperatures was at its second highest level of the decade; those from landslides, at their third highest; and those from earthquakes were at their fourth lowest.

The two deadliest DTNH in 2015 were the April earthquake in Nepal (8,831 deaths) and a heat wave in France (3,275 deaths). These numbers cannot be compared to those reported for the Haiti earthquake in 2010 (222,570 deaths), the cyclone Nargis in Myanmar in 2008 (138,375 deaths), the Sichuan earthquake in China in 2008 (87,476 deaths), the 2005 Kashmir earthquake (74,648 deaths) and a heat wave in Russia in 2010 (55,736 deaths).

Among DTTH, the number of deaths from miscellaneous accidents was the highest of the decade; those from transport accidents, at their second highest; and those from industrial accidents were at their fifth lowest.

The two deadliest 2015 DTTH were a stampede during the Hajj pilgrimage in Saudi Arabia (2,236 deaths) and the shipwreck of a migrants' vessel off the Lybian coast (822 deaths).

TABLE 7 Total number of people reported as affected, by type of phenomenon and by year (2006–2015), in thousands

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Droughts ²	44,371	8,278	37,481	109,666	132,525	75,604	43,882	13,124	69,716	53,258	587,905
Dry-mass movements ³	n.a.	n.d.r.	1	3	n.d.r.	n.d.r.	n.a.	n.a.	n.d.r.	n.a.	4
Earthquakes ⁴	3,859	1,382	47,580	3,221	6,937	1,748	2,860	7,031	3,212	7,171	85,001
Extreme temperatures	63	988	79,171	856	892	4,427	636	270	1,240	1,265	89,808
Floods ⁵	31,124	178,901	45,978	61,059	189,180	141,400	74,318	32,064	42,121	34,804	830,951
Insect infestations	n.a.	n.d.r.	n.d.r.	500	2,300	2,300	n.d.r.	n.d.r.	n.d.r.	n.d.r.	5,100
Landslides	432	9	5	44	2,460	7	4	1	19	50	3,031
Storms	67,112	23,999	15,652	50,583	8,931	38,585	20,265	49,150	25,791	10,390	310,457
Volcanic activities	379	51	40	57	171	49	10	94	210	959	2,018
Wild fires	3	1,785	59	12	30	15	6	9	12	494	2,425
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	143,106	213,961	178,346	222,719	336,319	262,338	139,112	94,617	138,898	100,262	1,829,677
<i>Subtotal disasters triggered by geophysical hazards</i>	4,237	1,433	47,621	3,281	7,108	1,796	2,870	7,125	3,422	8,130	87,024
Total DTNH	147,343	215,394	225,967	226,000	343,426	264,134	141,982	101,742	142,320	108,391	1,916,701
Industrial accidents	161	3	14	6	27	1	4	8	284	25	533
Miscellaneous accidents	35	41	21	23	7	48	17	7	9	72	280
Transport accidents	4	4	4	5	3	6	3	6	3	5	43
Total DTTH	199	48	39	33	37	55	24	22	296	102	856
Total	147,543	215,442	226,006	226,033	343,463	264,189	142,006	101,764	142,617	108,493	1,917,557

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ Since slow-onset disasters can affect the same people for a number of years, it is best to use figures on total numbers affected to calculate annual averages over a decade rather than as absolute totals.

² Includes food insecurities

³ Landslides, rockfalls, subsidence, etc. of geophysical origin

⁴ Includes tsunamis

⁵ Includes waves and surges

Notes: Some totals in this table may not correspond due to rounding. In this table, n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see section on caveats in the introduction to this annex.

In 2015, the number of people reported as affected by DTNH was the second lowest of the decade. In contrast, the number of people reported as affected by DTTH was the third highest of the decade.

Among DTNH, droughts affected the most people in 2015 (more than 53 million) but this number remains below its decade's average (59 million).

The number of people reported as affected by floods (almost 35 million) was the third lowest of the decade, far below its decade's average of 83 million.

Storms affected a total of 10.4 million people, a number which is also far below the decade's average (31 million).

The number of people reported affected by volcanic eruptions was the highest of the decade, while the numbers of those affected by earthquakes and wild fires were the second highest and from extreme temperatures, the third highest of the decade.

In 2015, the two DTNH which affected the most people were a drought in North Korea (18 million) and floods from heavy rains in July/August in India (almost 14 million).

The number of people affected by miscellaneous accidents was the highest of the decade; by transport accidents, the fourth highest; and by industrial accidents, the fourth highest.

The DTTH which affected the most people (50,000) was a fire in a slum area in Manila, the Philippines.

TABLE 8 Total amount of estimated damage from disasters, by type of phenomenon and by year (2006-2015), in millions of US dollars (2015 prices)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Droughts ¹	3,799	596	246	2,326	3,712	11,490	26,318	1,849	11,016	6,476	67,828
Dry-mass movements ²	n.a.	n.d.r.	n.a.	n.a.	n.d.r.	n.d.r.	n.a.	8	n.d.r.	n.a.	8
Earthquakes ³	4,157	17,635	97,307	6,862	52,959	249,957	19,711	9,233	7,183	6,028	471,031
Extreme temperatures	1,211	n.a.	24,884	1,251	517	848	162	1,017	2,521	94	32,506
Floods ⁴	9,871	28,365	22,818	9,105	46,391	85,522	27,232	54,211	38,110	21,078	342,703
Insect infestations	n.a.	n.d.r.	n.d.r.	n.a.	n.a.	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.a.
Landslides	49	n.a.	n.a.	175	1,430	n.a.	n.a.	n.a.	273	8	1,935
Storms	21,486	34,815	68,876	29,729	31,488	55,214	91,164	53,335	40,162	32,948	459,217
Volcanic activities	182	n.a.	n.a.	n.a.	n.a.	113	n.a.	n.a.	186	600	1,081
Wild fires	1,138	5,415	2,872	1,723	2,318	3,188	1,276	1,091	259	3,038	22,317
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	<i>37,552</i>	<i>69,191</i>	<i>119,696</i>	<i>44,310</i>	<i>85,856</i>	<i>156,263</i>	<i>146,152</i>	<i>111,503</i>	<i>92,341</i>	<i>63,642</i>	<i>926,506</i>
<i>Subtotal disasters triggered by geophysical hazards</i>	<i>4,339</i>	<i>17,635</i>	<i>97,307</i>	<i>6,862</i>	<i>52,959</i>	<i>250,070</i>	<i>19,711</i>	<i>9,241</i>	<i>7,369</i>	<i>6,628</i>	<i>472,120</i>
Total DTNH	41,891	86,826	217,003	51,172	138,815	406,333	165,862	120,744	99,710	70,270	1,398,627
Industrial accidents	n.a.	1,024	n.a.	1,736	22,508	n.a.	32	203	n.a.	n.a.	25,503
Miscellaneous accidents	1	n.a.	n.a.	n.a.	280	1	1	5	n.a.	n.a.	288
Transport accidents	n.a.	n.a.	n.a.	n.a.	n.a.	2	n.a.	380	n.a.	15	397
Total DTTH	1	1,024	n.a.	1,736	22,788	3	33	588	n.a.	15	26,188
Total	41,892	87,850	217,003	52,909	161,603	406,336	165,895	121,333	99,710	70,285	1,424,814

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ Includes food insecurities

² Landslides, rockfalls, subsidence, etc. of geophysical origin

³ Includes tsunamis

⁴ Includes waves and surges

Notes: Some totals in this table may not correspond due to rounding. In this table, n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

Estimates of disaster damage must be treated with caution, as the financial value attached to infrastructures in high and very high human development countries is much higher than in low and medium human development countries. While reporting is more accurate for large disasters, the low reporting rates of direct damage make analysis difficult.

In 2015, damages from DTNH were the third lowest of the decade. Damages from extreme temperatures were at their lowest level for the decade, those from earthquakes and tsunamis were at their second lowest, those from floods at their third lowest and those from storms at their fourth lowest, in each case far below their decade's average.

In contrast, damages from volcanic eruptions in 2015 were at their highest level for the decade, while those from wild fires at their third highest and those from droughts were at their fourth highest.

The highest amount of damages resulted from storms and floods, but this was 30 per cent below the decade's average for storms and 40 per cent below the average for floods.

The costliest DTNH was, in 2015, the earthquake that occurred in Nepal in April and caused damage of almost US\$ 5.2 billion.

The damage of US\$ 15 million in 2015 reported for transport accidents is attributable to the shipwreck of a passenger ship on the Yangtze River in China, in June.

TABLE 9 Total number of reported disasters, by type of phenomenon, continent and by level of human development¹
(2006–2015)

	Africa	Americas	Asia	Europe	Oceania	VHHD	HHH	MHD	LHD	Total
Droughts ²	118	59	42	7	9	13	49	47	126	235
Dry-mass movements ³	1	2	4	n.d.r.	1	n.d.r.	3	3	2	8
Earthquakes ⁴	9	40	168	21	10	38	117	64	29	248
Extreme temperatures	4	40	64	135	2	108	78	47	12	245
Floods ⁵	438	348	681	206	46	242	504	456	517	1,719
Insect infestations	4	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	4	4
Landslides	15	34	118	6	4	9	60	53	55	177
Storms	88	301	416	115	50	372	234	257	107	970
Volcanic activities	4	26	21	1	7	9	16	28	6	59
Wild fires	10	39	5	23	12	60	16	6	7	89
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	677	821	1,326	492	123	804	941	866	828	3,439
<i>Subtotal disasters triggered by geophysical hazards</i>	14	68	193	22	18	47	136	95	37	315
Total DTNH	691	889	1,519	514	141	851	1,077	961	865	3,754
Industrial accidents	51	38	246	39	2	30	243	53	50	376
Miscellaneous accidents	85	36	176	43	1	51	94	114	82	341
Transport accidents	644	270	496	197	12	187	455	407	570	1,619
Total DTTH	780	344	918	279	15	268	792	574	702	2,336
Total	1,471	1,233	2,437	793	156	1,119	1,869	1,535	1,567	6,090

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex. VHHH stands for very high human development, HHD for high human development, MHD for medium human development and LHD stands for low human development.

² Includes food insecurities

³ Landslides, rockfalls, subsidence, etc. of geophysical origin

⁴ Includes tsunamis

⁵ Includes waves and surges

Note: In this table, n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

During the decade, Asia accounted for 40 per cent of the total number of disasters but for 68 per cent of earthquakes, 67 per cent of landslides, 65 per cent of industrial accidents, 52 per cent of miscellaneous accidents and for 50 per cent of dry-mass movements.

Africa accounted for 24 per cent of the total number of disasters but for 100 per cent of insect infestations, 50 per cent of droughts/food insecurities and for 40 per cent of transport accidents.

Americas accounted for 20 per cent of the total number of disasters but for 44 per cent of volcanic eruptions and of wild fires, 31 per cent of storms and for 25 per cent of droughts.

Europe accounted for 13 per cent of the total number of disasters but for 55 per cent of extreme temperatures and for 26 per cent of wild fires.

Oceania accounted for 2.6 per cent of the total number of disasters but for 13 per cent of wild fires and for 12 per cent of volcanic eruptions.

In the decade, high human development countries accounted for 31 per cent of the total number of disasters but for 65 per cent of industrial accidents and for 47 per cent of earthquakes.

Low human development countries accounted for 26 per cent of the total number of disasters but for 100 per cent of insect infestations, 54 per cent of droughts and for 35 per cent of transport accidents.

Medium human development countries accounted for 25 per cent of the total number of disasters but for 47 per cent of volcanic eruptions, 33 per cent of miscellaneous accidents and for 30 per cent of landslides.

Very high human development countries accounted for 18 per cent of the total number of disasters but for 67 per cent of wild fires, 44 per cent of extreme temperatures and for 38 per cent of storms.

TABLE 10 Total number of people reported killed, by type of phenomenon, continent and by level of human development¹ (2006–2015)

	Africa	Americas	Asia	Europe	Oceania	VHHD	HHH	MHD	LHD	Total
Droughts ²	20,078	4	145	n.a.	24	n.a.	134	15	20,102	20,251
Dry-mass movements ³	98	48	86	n.d.r.	10	n.d.r.	69	150	23	242
Earthquakes ⁴	66	223,889	131,653	1,049	435	21,008	93,783	9,373	232,928	357,092
Extreme temperatures	148	2,133	8,641	67,672	486	11,667	59,486	4,988	2,939	79,080
Floods ⁵	7,980	6,186	41,616	1,063	182	1,651	14,531	23,958	16,887	57,027
Insect infestations	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.a.	n.a.
Landslides	618	1,386	7,337	42	94	263	4,001	2,830	2,383	9,477
Storms	1,259	4,759	167,099	318	260	3,957	3,894	24,586	141,258	173,695
Volcanic activities	5	21	434	n.a.	n.a.	63	21	365	11	460
Wild fires	131	130	86	215	191	437	166	87	63	753
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	30,214	14,598	224,924	69,310	1,237	17,975	82,212	56,464	183,632	340,283
<i>Subtotal disasters triggered by geophysical hazards</i>	169	223,958	132,173	1,049	445	21,071	93,873	9,888	232,962	357,794
Total DTNH	30,383	238,556	357,097	70,359	1,682	39,046	176,085	66,352	416,594	698,077
Industrial accidents	2,053	747	7,675	1,187	29	403	6,273	2,609	2,406	11,691
Miscellaneous accidents	2,434	1,269	7,334	1,139	10	3,621	2,388	3,987	2,190	12,186
Transport accidents	19,873	5,912	17,948	5,637	587	5,068	13,813	13,805	17,271	49,957
Total DTTH	24,360	7,928	32,957	7,963	626	9,092	22,474	20,401	21,867	73,834
Total	54,743	246,484	390,054	78,322	2,308	48,138	198,559	86,753	438,461	771,911

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex. VHHH stands for very high human development, HHD for high human development, MHD for medium human development and LHD stands for low human development.

² Includes food insecurities

³ Landslides, rockfalls, subsidence, etc. of geophysical origin

⁴ Includes tsunamis

⁵ Includes waves and surges

Notes: In this table, n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

During the decade, Asia accounted for 51 per cent of the total number of people killed by disasters but for 96 per cent of deaths from windstorms, 94 per cent of those from volcanic eruptions, 77 per cent from landslides, 73 per cent from floods, 66 per cent from industrial accidents and for 60 per cent of death from miscellaneous accidents.

Americas accounted for 32 per cent of all deaths from disasters but for 63 per cent of those from earthquakes.

Europe accounted for 10 per cent of the total number of deaths from disasters but for 86 per cent of those from extreme temperatures and for 29 per cent of deaths from wild fires.

Africa accounted for 7 per cent of the total number of deaths from disasters but for 99 per cent of those from droughts, 40 per cent from dry-mass movements, 40 per cent from transport accidents, 20 per cent from miscellaneous accidents, 18 per cent from industrial accidents and for 14 per cent of deaths from floods.

Oceania accounted for 0.3 per cent of the total number of deaths from disasters but for 25 per cent of deaths from wild fires, 4 per cent from dry-mass movements and for 1 per cent of those from transport accidents.

In the decade, 68 per cent of people killed by disasters lived in low and medium human development countries.

Low human development countries accounted for 57 per cent of the total number of deaths from disasters but for 99 per cent of those killed by droughts, 81 per cent of people killed by storms and for 65 per cent of deaths from earthquakes.

Medium human development countries accounted for 11 per cent of people killed by disasters, but for 79 per cent of deaths from volcanic eruptions, 62 per cent from dry-mass movements, 42 per cent from floods, 33 per cent of those caused by miscellaneous accidents, 28 per cent from transport accidents and for 22 per cent of those from industrial accidents.

High human development countries accounted for 26 per cent of all deaths from disasters, but for 75 per cent of those from extreme temperatures, 54 per cent from industrial accidents and for 42 per cent of those from landslides.

Very high human development countries accounted for only 6 per cent of deaths from disasters but for 58 per cent of those caused by wild fires, 30 per cent from miscellaneous accidents, 15 per cent from extreme temperatures, 14 per cent from volcanic eruptions and for 10 per cent of those from transport accidents.

TABLE 11 Total number of people reported affected, by type of phenomenon, continent and by level of human development¹ (2006–2015), in thousands

	Africa	Americas	Asia	Europe	Oceania	VHHD	HHH	MHD	LHD	Total
Droughts ²	228,865	43,359	313,392	216	2,073	n.a.	308,090	23,453	256,362	587,905
Dry-mass movements ³	1	3	n.a.	n.d.r.	n.a.	n.d.r.	n.a.	4	n.a.	4
Earthquakes ⁴	53	10,035	73,999	284	631	5,188	56,744	12,599	10,470	85,001
Extreme temperatures	8	1,678	87,500	621	2	231	86,770	2,507	301	89,808
Floods ⁵	32,618	46,314	747,056	4,067	896	15,383	552,670	181,695	81,203	830,951
Insect infestations	5,100	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	5,100	5,100
Landslides	39	96	2,885	n.a.	10	23	2,169	196	642	3,031
Storms	2,730	9,153	297,002	874	699	8,349	161,621	132,394	8,093	310,457
Volcanic activities	7	1,396	592	n.a.	23	22	1,299	691	7	2,018
Wild fires	71	891	430	1,021	13	801	1,018	537	69	2,425
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	<i>269,430</i>	<i>101,491</i>	<i>1,448,263</i>	<i>6,800</i>	<i>3,693</i>	<i>24,787</i>	<i>1,112,338</i>	<i>340,782</i>	<i>351,770</i>	<i>1,829,677</i>
<i>Subtotal disasters triggered by geophysical hazards</i>	<i>61</i>	<i>11,434</i>	<i>74,592</i>	<i>284</i>	<i>654</i>	<i>5,210</i>	<i>58,043</i>	<i>13,294</i>	<i>10,477</i>	<i>87,024</i>
Total DTNH	269,491	112,924	1,522,855	7,084	4,347	29,998	1,170,381	354,076	362,247	1,916,701
Industrial accidents	114	120	287	12	n.a.	34	306	79	115	533
Miscellaneous accidents	86	6	176	12	n.a.	5	20	192	63	280
Transport accidents	15	9	14	5	n.a.	9	10	13	11	43
Total DTTH	216	134	477	29	n.a.	48	336	284	188	856
Total	269,707	113,059	1,523,332	7,113	4,347	30,046	1,170,716	354,360	362,434	1,917,557

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex. VHHD stands for very high human development, HHD for high human development, MHD for medium human development and LHD stands for low human development.

² Includes food insecurities

³ Landslides, rockfalls, subsidence, etc. of geophysical origin

⁴ Includes tsunamis

⁵ Includes waves and surges

Notes: Some totals in this table may not correspond due to rounding. In this table, n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

During the decade, the highest proportion of people affected by disasters was in Asia (79 per cent) but the continent accounted for 97 per cent of people affected by extreme temperatures, 96 per cent of those affected by storms, 95 per cent of people affected by landslides, 90 per cent of those affected by floods and for 87 per cent of those affected by earthquakes.

Africa accounted for 14 per cent of people affected by disasters but for 100 per cent of people affected by insect infestations, 39 per cent of those affected by droughts, 36 per cent of those affected by transport accidents, 31 per cent of those affected by miscellaneous industrial accidents and for 21 per cent of those affected by industrial accidents.

Americas accounted for 6 per cent of people affected by disasters but for 81 per cent of those affected by dry-mass movements, 69 per cent of those affected by volcanic eruptions, 37 per cent of people affected by wild fires, 22 per cent of those affected by industrial accidents and for 21 per cent of those affected by transport accidents.

Europe accounted for only 0.4 per cent of people affected by disasters but for 42 per cent of those affected by wild fires and for 3 per cent of those affected by DTTH.

Oceania accounted for only 0.2 per cent of people affected but for 1 per cent of those affected by volcanic eruptions, 0.7 per cent of those affected by earthquakes and for 0.5 per cent of those affected by wild fires.

High human development countries accounted for 61 per cent of the total number of people reported as affected by disasters but for 97 per cent of those affected by extreme temperatures, 72 per cent of those affected by landslides, and for 67 per cent of those affected by earthquakes and floods.

Low human development countries accounted for 19 per cent of the total number of people reported as affected by disasters but for 100 per cent of those affected by insect infestations, 44 per cent of those affected by droughts and for 24 per cent of those affected by transport accidents.

Medium human development countries accounted for 18 per cent of the total number of people reported as affected by disasters but for almost 100 per cent of those affected by dry-mass movements, 69 per cent of those affected by miscellaneous accidents, 43 per cent of those affected by storms and for 31 per cent of those affected by transport accidents.

Very high human development countries accounted for less than 2 per cent of the total number of people reported as affected by disasters but for 33 per cent of those affected by wild fires and for 22 per cent of those affected by transport accidents.

TABLE 12 Total amount of estimated disaster damage, by type of phenomenon, continent and by level of human development¹ (2006 to 2015) - in millions of US dollars (2015 prices)

	Africa	Americas	Asia	Europe	Oceania	VHHD	HHH	MHD	LHD	Total
Droughts ²	2,141	41,319	16,877	6,594	897	36,673	27,988	2,953	214	67,828
Dry-mass movements ³	n.a.	n.a.	8	n.d.r.	n.a.	n.d.r.	8	n.a.	n.a.	8
Earthquakes ⁴	8	47,532	373,311	23,164	27,017	327,868	120,835	8,070	14,257	471,031
Extreme temperatures	n.a.	5,408	25,298	1,800	n.a.	4,913	26,623	953	18	32,506
Floods ⁵	4,221	55,994	212,862	55,747	13,880	104,820	166,315	48,367	23,201	342,703
Insect infestations	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.a.	n.a.
Landslides	n.a.	802	1,133	n.a.	n.a.	75	1,008	814	38	1,935
Storms	1,237	285,876	119,429	38,989	13,686	328,292	85,440	37,954	7,531	459,217
Volcanic activities	n.a.	895	186	n.a.	n.a.	713	182	186	n.a.	1,081
Wild fires	488	12,858	1,319	5,145	2,507	18,622	2,155	1,540	n.a.	22,317
<i>Subtotal disasters triggered by climato-, hydro- and meteorological hazards</i>	<i>8,086</i>	<i>402,258</i>	<i>376,917</i>	<i>108,275</i>	<i>30,970</i>	<i>493,395</i>	<i>309,529</i>	<i>92,580</i>	<i>31,003</i>	<i>926,506</i>
<i>Subtotal disasters triggered by geophysical hazards</i>	<i>8</i>	<i>48,426</i>	<i>373,506</i>	<i>23,164</i>	<i>27,017</i>	<i>328,581</i>	<i>121,025</i>	<i>8,257</i>	<i>14,257</i>	<i>472,120</i>
Total DTNH	8,094	450,684	750,423	131,439	57,987	821,976	430,554	100,837	45,260	1,398,627
Industrial accidents	n.a.	22,603	262	2,638	n.a.	22,750	2,523	230	n.a.	25,503
Miscellaneous accidents	n.a.	285	3	n.a.	n.a.	280	5	2	1	288
Transport accidents	n.a.	239	17	140	n.a.	380	15	2	n.a.	397
Total DTTH	8,094	23,127	282	2,778	23,410	2,543	234	234	1	26,188
Total	8,094	473,811	750,705	134,217	57,987	845,386	433,096	101,071	45,261	1,424,814

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the disaster definitions section in the introduction to this annex. VHHD stands for very high human development, HHD for high human development, MHD for medium human development and LHD stands for low human development.

² Includes food insecurities

³ Landslides, rockfalls, subsidence, etc. of geophysical origin

⁴ Includes tsunamis

⁵ Includes waves and surges

Notes: Some totals in this table may not correspond due to rounding. In this table, n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

Estimates of disaster damage must be treated with caution, as the financial value attached to infrastructures in high and very high human development countries is much higher than in low and medium human development countries. While reporting is more accurate for large disasters, the low reporting rates of direct damage make analysis difficult.

During the decade, Asia accounted for 53 per cent of the total reported damages but for 100 per cent of costs from dry-mass movements, 79 per cent related to earthquakes, 78 per cent from extreme temperatures and for 62 per cent of costs for damages caused by floods.

Americas accounted for 33 per cent of total reported damages but for 99 per cent of those from miscellaneous accidents, 88 per cent from industrial accidents, 83 per cent from volcanic eruptions, 62 per cent from storms, 61 per cent from droughts, 60 per cent from transport accidents, 58 per cent from wild fires and for 41 per cent of costs from landslides.

Europe accounted for 9 per cent of total reported damages but for 35 per cent of those caused by transport accidents, 23 per cent from wild fires and for 16 per cent of those caused by floods.

Oceania accounted for 4 per cent of all damages but for 11 per cent of those from wild fires and 6 per cent of those caused by earthquakes.

Africa accounted for only 0.6 per cent of all reported damages but for 3 per cent of those from droughts, 2 per cent from wild fires and for 1 per cent of those caused by floods.

Fifty-nine per cent of disaster damages were reported from very high human development countries, 30 per cent from high human development countries, 7 per cent from medium human development countries and 3 per cent of disaster damages were reported from low human development countries.

TABLE 13 Total number of people reported killed and affected by disasters by country (1996–2005; 2006–2015; and 2015)

	Total number of people reported killed (1993–2005)	Total number of people reported affected ^a (1993–2005)	Total number of people reported killed (2006–2015)	Total number of people reported affected ^a (2006–2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
AFRICA	44,849	288,240,653	54,743	269,706,805	3,858	30,924,400
Algeria	3,908	307,669	619	159,825	30	35,050
Angola	875	723,862	594	2,478,810	75	5,000
Benin	245	677,305	258	1,220,809	n.d.r.	n.d.r.
Botswana	3	143,736	12	9,266	n.a.	n.a.
Burkina Faso	95	110,220	425	10,197,968	23	28,925
Burundi	330	4,170,050	332	4,752,223	63	2,870
Cameroon	452	6,386	665	373,355	4	30,000
Cape Verde	18	40,000	84	5,151	24	2,500
Central African Republic	242	113,261	473	131,030	133	1,292
Chad	173	1,506,334	131	8,958,720	n.d.r.	n.d.r.
Comoros	282	284,300	495	87,296	n.d.r.	n.d.r.
Congo	113	170,163	412	53,367	n.d.r.	n.d.r.
Congo Democratic Republic	2,737	272,108	3,323	454,191	193	247,727
Djibouti	52	450,350	145	1,273,339	n.d.r.	n.d.r.
Egypt	2,006	6,454	2,673	7,995	254	256
Equatorial Guinea	82	4,300	23	1,000	n.d.r.	n.d.r.
Eritrea	128	11,507,043	n.a.	1,700,000	n.d.r.	n.d.r.
Ethiopia	1,137	39,349,742	1,054	49,792,366	n.a.	10,410,600
Gabon	50	11	88	83,940	n.d.r.	n.d.r.
Gambia	68	51,406	58	487,890	n.a.	n.a.
Ghana	510	471,000	745	691,699	175	5,060

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996–2005; 2006–2015; and 2015)

	Total number of people reported killed (1993–2005)	Total number of people reported affected ^a (1993–2005)	Total number of people reported killed (2006–2015)	Total number of people reported affected ^a (2006–2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Guinea	309	220,937	528	175,756	26	30,131
Guinea Bissau	218	102,508	186	89,965	11	2
Ivory Coast	416	203	327	114,069	35	35
Kenya	1,574	102,226,197	1,726	24,438,833	139	1,845,440
Lesotho	1	1,002,251	66	2,413,190	n.d.r.	n.d.r.
Liberia	70	5,000	25	536,926	n.d.r.	n.d.r.
Libya	201	79	2,062	2,806	1,012	537
Madagascar	1,072	5,685,807	708	9,355,993	121	226,437
Malawi	788	9,335,960	427	13,682,605	283	3,438,995
Mali	189	1,046,646	467	8,838,721	15	2,000
Mauritania	141	3,125,780	163	3,166,151	14	20
Mauritius	6	2,050	24	82	n.d.r.	n.d.r.
Mayotte	n.d.r.	n.d.r.	54	12	n.d.r.	n.d.r.
Morocco	1,591	925,354	825	233,713	34	n.a.
Mozambique	1,461	8,733,281	911	5,018,367	229	177,684
Namibia	21	945,209	295	1,730,950	n.a.	11,500
Niger	135	10,285,957	294	28,842,314	27	2,675,165
Nigeria	9,304	603,434	4,414	8,975,734	250	100,465
Reunion (F)	2	3,700	3	355	n.d.r.	n.d.r.
Rwanda	268	4,984,990	182	2,042,637	2	3,431
Saint Helena (UK)	n.d.r.	300	n.d.r.	n.d.r.	n.d.r.	n.d.r.

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996-2005; 2006-2015; and 2015)

	Total number of people reported killed (1993-2005)	Total number of people reported affected ^a (1993-2005)	Total number of people reported killed (2006-2015)	Total number of people reported affected ^a (2006-2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Sao Tome and Principe	n.d.r.	n.d.r.	33	34	n.d.r.	n.d.r.
Senegal	1,609	918,711	345	3,600,966	13	640,168
Seychelles	8	12,867	n.a.	7,435	n.d.r.	n.d.r.
Sierra Leone	869	215,025	554	32,854	10	24,303
Somalia	3,210	4,328,629	20,442	24,864,205	n.a.	5,970,296
South Africa	1,704	15,215,925	1,303	3,145,974	113	2,706,052
South Sudan ¹	n.d.r.	n.d.r.	407	830,941	244	150
Sudan	1,460	8,953,459	1,316	14,662,306	36	800,000
Swaziland	52	4,153,209	26	420,955	12	20
Tanzania	2,230	19,094,044	1,342	5,970,464	141	10,142
Togo	n.a.	95,405	244	299,840	n.d.r.	n.d.r.
Tunisia	383	27,134	342	7,215	18	98
Uganda	1,186	3,913,437	1,244	4,345,797	31	n.a.
Zambia	438	3,341,629	337	2,243,677	34	4
Zimbabwe	427	18,369,836	512	16,694,723	34	1,492,045
AMERICAS	85,206	76,217,331	246,484	113,058,627	1,691	6,873,801
Anguilla (UK)	n.a.	150	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Antigua and Barbuda	4	7,982	n.a.	30,800	n.d.r.	n.d.r.
Argentina	603	860,863	517	806,101	72	145,641
Aruba (NL)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Bahamas	14	10,500	143	27,792	33	6,710
Barbados	1	2,880	n.a.	2,501	n.d.r.	n.d.r.

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996–2005; 2006–2015; and 2015)

	Total number of people reported killed (1993–2005)	Total number of people reported affected ^a (1993–2005)	Total number of people reported killed (2006–2015)	Total number of people reported affected ^a (2006–2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Belize	78	142,570	8	88,000	n.a.	20,000
Bermuda	22	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Bolivia	972	859,485	880	3,631,856		96,890
Brazil	2,216	22,516,901	3,409	35,032,393	116	309,405
Canada	469	77,359	151	152,085	n.a.	13,036
Cayman Islands (UK)	2	300	n.a.	n.a.	n.d.r.	n.d.r.
Chile	208	624,632	1,064	4,452,397	204	884,066
Colombia	2,751	3,095,807	2,330	12,656,647	129	873
Costa Rica	155	869,863	100	450,818	n.a.	28,116
Cuba	287	10,712,339	206	1,043,238	n.a.	100,000
Dominica	14	990	32	36,364	30	28,594
Dominican Republic	1,652	1,107,711	298	377,488	2	23,333
Ecuador	812	449,058	467	1,921,109	12	931,227
El Salvador	1,977	2,161,977	413	1,507,931	13	520,000
Falkland Islands (UK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
French Guiana (F)	10	70,005	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Greenland (DK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Grenada	40	61,860	n.a.	n.a.	n.d.r.	n.d.r.
Guadeloupe (F)	25	1,052	n.a.	n.a.	n.d.r.	n.d.r.
Guatemala	2,659	818,643	1,055	8,134,569	352	1,321,770
Guyana	34	1,527,174	n.a.	334,000	n.a.	199,000

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996-2005; 2006-2015; and 2015)

	Total number of people reported killed (1993-2005)	Total number of people reported affected ^a (1993-2005)	Total number of people reported killed (2006-2015)	Total number of people reported affected ^a (2006-2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Haiti	6,808	685,293	224,152	6,673,540	46	1,047,065
Honduras	14,968	3,887,920	696	1,356,725	n.d.r.	n.d.r.
Jamaica	36	388,022	35	352,089	n.d.r.	n.d.r.
Martinique (F)	n.a.	600	3	106	n.d.r.	n.d.r.
Mexico	3,451	5,616,021	1,771	8,655,634	160	21,985
Montserrat (UK)	32	8,000	n.a.	200	n.d.r.	n.d.r.
Netherlands Antilles (NL)	15	4	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Nicaragua	3,494	1,572,301	437	1,538,412	2	463,750
Panama	52	71,833	125	167,981	n.a.	3,500
Paraguay	558	303,644	43	2,546,270	14	150,175
Peru	3,541	6,371,678	4,111	5,409,399	144	435,332
Puerto Rico (USA)	160	72,904	3	3,771	n.d.r.	n.d.r.
Saint Kitts and Nevis	5	11,180	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Saint Lucia	n.a.	375	21	202,984	n.d.r.	n.d.r.
Saint Pierre et Miquelon (F)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Saint Vincent and the Grenadines	4	1,634	12	23,797	n.d.r.	n.d.r.
Suriname	10	n.a.	25	31,548	n.d.r.	n.d.r.
Trinidad and Tobago	3	2,377	n.a.	n.a.	n.d.r.	n.d.r.
Turks and Caicos Islands (UK)	43	200	107	1,650	n.d.r.	n.d.r.
United States	6,153	10,463,765	3,538	15,099,494	335	49,699
Uruguay	117	27,559	29	152,334	10	28,326
Venezuela	30,748	751,917	303	156,604	17	45,308

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996–2005; 2006–2015; and 2015)

	Total number of people reported killed (1993–2005)	Total number of people reported affected ⁹ (1993–2005)	Total number of people reported killed (2006–2015)	Total number of people reported affected ⁹ (2006–2015)	Total number of people reported killed (2015)	Total number of people reported affected ⁹ (2015)
Virgin Islands (UK)	n.a.	3	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Virgin Islands (US)	3	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
ASIA	1,043,475	2,416,805,041	390,054	1,523,331,637	21,770	68,083,036
Afghanistan	10,410	8,376,892	4,594	4,941,176	468	126,784
Armenia	16	319,156	n.a.	88,000	n.d.r.	n.d.r.
Azerbaijan	196	819,008	77	97,595	44	96
Bahrain	143	n.a.	92	60	n.d.r.	n.d.r.
Bangladesh	10,882	70,441,616	9,906	45,556,211	290	4,035,286
Bhutan	200	1,000	24	20,028	n.d.r.	n.d.r.
Brunei Darussalam	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Cambodia	640	16,017,614	947	3,977,465	n.d.r.	n.d.r.
China's People Republic ^{2,3}	33,295	1,285,225,236	111,846	1,019,008,563	1,929	3,779,096
East Timor/Timor-Leste	4	4,008	1	9,677	n.d.r.	n.d.r.
Georgia	157	1,415,164	52	164,762	40	10,320
Hong Kong (China) ²	168	4,892	87	15,813	n.a.	100
India	85,732	713,342,088	26,895	132,164,431	3,666	16,561,182
Indonesia	175,193	5,811,092	14,826	10,587,329	386	440,670
Iran Islamic Republic	34,136	113,332,698	1,738	937,661	107	26,481
Iraq	1,323	8,908	325	130,845	58	65,000
Israel	113	1,857	74	2,023,250	n.a.	200
Japan	1,056	1,967,436	21,468	1,036,626	64	117,266

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996-2005; 2006-2015; 2006-2015; and 2015)

	Total number of people reported killed (1993-2005)	Total number of people reported affected ^a (1993-2005)	Total number of people reported killed (2006-2015)	Total number of people reported affected ^a (2006-2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Jordan	116	330,274	48	80	n.d.r.	n.d.r.
Kazakhstan	91	675,970	270	93,158	18	12,670
Korea, Democratic People's Republic	534,523	60,490,218	1,333	23,407,149	33	18,003,541
Korea Republic	2,039	732,260	798	85,715	5	125
Kuwait	2	200	44	76	n.d.r.	n.d.r.
Kyrgyzstan	203	13,536	159	2,062,372	n.a.	16,780
Lao Democratic People's Republic	159	1,493,005	179	1,423,020	27	47,940
Lebanon	48	17,555	140	1,001,746	5	1,001,692
Macau (China) ^b	n.d.r.	n.d.r.	n.a.	133	n.d.r.	n.d.r.
Malaysia	646	209,827	600	2,856,160	86	3,010
Maldives	143	27,314	n.a.	204,649	n.d.r.	n.d.r.
Mongolia	162	3,936,711	98	2,518,234	n.a.	965,000
Myanmar	581	281,947	139,608	12,335,552	365	9,015,369
Nepal	3,457	1,472,873	11,566	7,806,671	9,034	5,640,301
Oman	104	104	118	26,211	n.a.	6,000
Pakistan	79,671	29,326,376	9,957	39,345,332	2,044	2,160,478
Palestine (West Bank and Gaza) ^c	14	20	15	96,386	4	31,050
Philippines	6,723	29,692,629	20,078	107,230,842	330	4,073,846
Qatar	n.d.r.	n.d.r.	61	31	n.d.r.	n.d.r.
Saudi Arabia	1,248	15,881	3,338	13,569	2,465	1,581
Singapore	n.a.	1,200	n.d.r.	n.d.r.	n.d.r.	n.d.r.

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996–2005; 2006–2015; and 2015)

	Total number of people reported killed (1993–2005)	Total number of people reported affected ^a (1993–2005)	Total number of people reported killed (2006–2015)	Total number of people reported affected ^a (2006–2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Sri Lanka	36,026	6,318,704	803	9,725,904	10	27,309
Syrian Arab Republic	366	668,676	191	3,903,641	70	3,530
Taiwan (China)	3,504	1,179,039	953	2,350,156	61	1,267
Tajikistan	238	6,662,966	248	2,929,649	12	18,778
Thailand	9,905	25,396,474	2,235	62,800,658	13	n.a.
Turkmenistan	51	n.a.	15	n.a.	n.d.r.	n.d.r.
United Arab Emirates	183	41	69	52	10	8
Uzbekistan	168	1,225,488	36	3,616	n.d.r.	n.d.r.
Viet Nam	8,351	29,279,195	2,825	18,708,726	59	1,765,215
Yemen	1,089	267,893	1,317	1,642,657	67	125,065
EUROPE	104,930	18,469,737	78,322	7,112,676	5,165	232,584
Albania	30	605,009	71	310,207	1	42,300
Austria	626	71,294	103	721	70	n.a.
Azores (P)	74	1,215	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Belarus	92	23,499	11	44,775	n.d.r.	n.d.r.
Belgium	1,242	3,937	1,408	955	410	n.a.
Bosnia-Herzegovina	66	354,179	47	1,059,587	n.a.	n.a.
Bulgaria	59	14,140	144	48,492	5	n.a.
Canary Islands (SP)	136	869	32	411	n.d.r.	n.d.r.
Croatia	882	4,250	36	12,982	n.a.	1,200
Cyprus	88	1,240	17	62	n.d.r.	n.d.r.

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996-2005; 2006-2015; and 2015)

	Total number of people reported killed (1993-2005)	Total number of people reported affected ^a (1993-2005)	Total number of people reported killed (2006-2015)	Total number of people reported affected ^a (2006-2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Czech Republic	502	302,205	115	1,320,277	n.d.r.	n.d.r.
Denmark	13	2,072	2	n.a.	n.d.r.	n.d.r.
Estonia	22	130	14	n.a.	n.d.r.	n.d.r.
Finland	35	448	n.d.r.	n.d.r.	n.d.r.	n.d.r.
France	20,246	3,593,512	4,940	513,070	3,349	47
Germany	9,737	436,823	240	8,473	n.d.r.	n.d.r.
Gibraltar (UK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Greece	679	127,808	408	92,058	85	236
Hungary	228	147,575	628	112,937	n.d.r.	n.d.r.
Iceland	n.a.	199	n.a.	n.a.	n.d.r.	n.d.r.
Ireland	13	1,200	4	600	1	n.a.
Isle of Man (UK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Italy	21,012	111,912	2,127	102,825	596	677
Latvia	42	n.a.	104	29	n.d.r.	n.d.r.
Lithuania	64	n.a.	64	n.a.	n.d.r.	n.d.r.
Luxembourg	190	n.a.	n.a.	n.a.	n.d.r.	n.d.r.
Macedonia (FYR)	43	108,409	39	1,125,581	21	105,030
Malta	325	6	97	25	n.d.r.	n.d.r.
Moldova	12	2,610,957	38	239,598	n.d.r.	n.d.r.
Montenegro ^b	n.d.r.	n.d.r.	14	13,668	n.d.r.	n.d.r.
Netherlands	1,082	5,303	1,022	117	n.d.r.	n.d.r.

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996–2005; 2006–2015; and 2015)

	Total number of people reported killed (1993–2005)	Total number of people reported affected ⁶ (1993–2005)	Total number of people reported killed (2006–2015)	Total number of people reported affected ⁶ (2006–2015)	Total number of people reported killed (2015)	Total number of people reported affected ⁶ (2015)
Norway	251	2,142	4	600	n.d.r.	n.d.r.
Poland	1,038	244,953	1,403	103,129	77	n.a.
Portugal	2,871	153,774	128	5,044	1	n.a.
Romania	503	326,306	579	67,534	57	1,666
Russian Federation	4,238	3,192,955	58,867	535,969	253	7,730
Serbia ⁶	n.d.r.	n.d.r.	90	201,844	n.d.r.	n.d.r.
Serbia-Montenegro ⁶	132	92,590	49	36,434	n.d.r.	n.d.r.
Slovakia	78	58,393	187	1,059	n.d.r.	n.d.r.
Slovenia	290	1,305	22	65,600	n.d.r.	n.d.r.
Spain	15,711	56,897	517	23,867	19	159
Sweden	74	162	7	n.a.	n.d.r.	n.d.r.
Switzerland	1,189	4,305	43	3,188	n.d.r.	n.d.r.
Turkey	19,873	5,115,501	2,115	156,220	140	6,768
Ukraine	621	398,062	1,717	431,285	66	3,171
United Kingdom	521	294,201	869	473,453	14	63,600
OCEANIA	3,377	2,427,728	2,308	4,347,206	66	2,379,323
American Samoa (USA)	6	23,063	34	2,500	n.d.r.	n.d.r.
Australia	342	694,147	947	528,154	16	8,655
Cook Islands (NZ)	19	2,252	n.a.	2,202	n.d.r.	n.d.r.
Fiji	92	304,327	51	149,808	n.a.	67,000
French Polynesia (F)	13	511	21	3,411	n.d.r.	n.d.r.

TABLE 13 (continued) Total number of people reported killed and affected by disasters by country (1996-2005; 2006-2015; and 2015)

	Total number of people reported killed (1993-2005)	Total number of people reported affected ^a (1993-2005)	Total number of people reported killed (2006-2015)	Total number of people reported affected ^a (2006-2015)	Total number of people reported killed (2015)	Total number of people reported affected ^a (2015)
Guam (USA)	230	21,864	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Kiribati	n.a.	84,000	n.a.	1,805	n.a.	1,500
Marshall Islands	n.d.r.	n.d.r.	n.a.	7,344	n.d.r.	n.d.r.
Micronesia Federated States	48	37,431	5	35,000	5	35,000
Nauru	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
New Caledonia (F)	2	1,100	n.d.r.	n.d.r.	n.d.r.	n.d.r.
New Zealand	28	9,040	248	618,166	1	500
Niue (NZ)	1	702	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Northern Mariana Islands	3	500	n.a.	360	n.a.	360
Palau	1	12,004	n.a.	n.a.	n.d.r.	n.d.r.
Papua New Guinea	2,416	1,126,963	593	2,568,368	24	2,029,199
Samoa	10	n.a.	160	18,287	n.a.	n.a.
Solomon Islands	n.a.	1,915	141	142,005	9	44,496
Tokelau (NZ)	n.a.	26	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Tonga	n.a.	23,071	85	4,575	n.a.	n.a.
Tuvalu	18	n.a.	n.a.	4,613	n.a.	4,613
Vanuatu	148	84,812	23	259,356	11	188,000
Wallis and Futuna (F)	n.d.r.	n.d.r.	n.a.	1,252	n.d.r.	n.d.r.
World	1,281,837	2,802,160,490	771,911	1,917,566,951	32,550	108,493,144

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ South Sudan became an independent state on 9 July 2011.

² Since July 1997, Hong Kong has been included in China as Special Administrative Region (SAR).

³ Since December 1999, Macau has been included in China as Special Administrative Region (SAR).

⁴ Since May 2002, East Timor has been an independent country.

⁵ Since September 1983 and the Israel-PLO Declaration of Principles, the Gaza Strip and the West Bank have a Palestinian self-government. Direct negotiations to determine the permanent status of these territories began in September 1999 but are far from a being permanent agreement.

⁶ From 1992 to 2003 Serbia and Montenegro were considered one country (Yugoslavia); in 2003, Yugoslavia became the State Union of Serbia and Montenegro and, in 2006, two separate countries: Serbia and Montenegro.

⁷ Since slow-onset disasters can affect the same country for a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the data definitions and methodology section in the introduction to this annex).

Notes: n.a. signifies 'no data available'; n.d.r. signifies 'no disaster reported'.

For more information, see the section on caveats in the introduction to this annex.

* Over the past decade, the highest numbers of deaths per continent were reported in Somalia (Africa), Haiti (the Americas), Myanmar (Asia), Russian Federation (Europe) and Australia (Oceania).

In 2015, the countries with the highest number of deaths from disasters and of people reported as affected by disasters were: in Africa, respectively Lybia and Ethiopia; in Asia, India and North Korea; and in Europe, France and Macedonia. In the Americas, Guatemala has both the highest number of deaths and disaster-affected people; and, in Oceania, it is Papua New Guinea.

Compared to 1996-2005, the past decade has seen the number of disaster-related deaths reduced by 40 per cent and of people reported as affected reduced by one-third.

However, the figure is somewhat different between continents. The number of deaths increased by 20 per cent in Africa and was multiplied by a factor of 3 in the Americas; meanwhile, it fell by one-third in Oceania, one-quarter in Europe and by 60 per cent in Asia.

The number of people reported as affected fell by 70 per cent in Europe, 37 per cent in Asia and by 6 per cent in Africa. On the other hand, it increased by 80 per cent in Oceania and by 50 per cent in the Americas.

For the 2006-2015 decade, the countries with the highest number of deaths from disasters and people reported as affected were: in Africa, respectively Somalia and Ethiopia; in the Americas, Haiti and Brazil; in Asia, Myanmar and China; in Europe, the Russian Federation and the Czech Republic; and in Oceania, Australia and Papua New Guinea.

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The Fundamental Principles of the International Red Cross and Red Crescent Movement

Humanity The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace among all peoples.

Impartiality It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

Neutrality In order to continue to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

Independence The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

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Jan Egeland, Secretary-General, Norwegian Refugee Council

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