

consider risk from non-climate-related natural and man-made hazards and risks (especially geophysical and biological, technological and environmental), as well as cascading and systemic risks, including possible amplifying effects of climate change.

Integrated and coordinated activities – minimizing complexity and avoiding duplication

Many organizations have prepared supplementary materials to NAP technical guidelines, to offer advice on how to promote synergy with other frameworks. A supplement that covers DRR issues is under development by UNISDR and UNFCCC in close collaboration with the Least Developed Countries Expert Group on Adaptation. It will provide options for countries to better coordinate their efforts at the national level when addressing DRR and CCA through NAPs.

There are other global frameworks and multilateral agreements that also entail actions which address CCA and DRR. For example, the NUA and regional frameworks – such as Africa 2063 – have areas of work that can be better integrated at the national level. A broader integrating framework, such as the NAP-SDG iFrame being developed by the UNFCCC Least Developed Countries Expert Group, may be suitable to support formulation and implementation of adaptation plans.

Global attempts to create synergies are commonly successful when coordination at regional, national and local levels is assured by a strong lead institution with a robust coordination mandate. As DRR and CCA are issues that affect many sectors, isolated action is rarely successful, and real coherence can take place only if silos are broken at the level where implementation occurs.

Integration of disaster risk reduction and climate change adaptation into financial and budgetary instruments and frameworks

Many of the country cases cited illustrate the importance of adequate capacities and resources for implementation. While a strong governance mechanism and accessible risk information are imperative for implementation, risk reduction remains aspirational unless it is translated into a budgetary process. Instead of perpetuating institutional competition for separate resource streams, financial instruments need to be made available that operate at the nexus between DRR and CCA and provide comprehensive financial resources. Financing mechanisms still need to be adjusted to this paradigm.

Overall, the approach of integrating DRR into CCA plans seems to be most successful where hydro-meteorological disaster risks are most prominent, and the impact of climate change is felt most keenly. Integrated approaches may not be the right fit for all countries, but the potential for accelerating implementation is significant, when there is political will.

Chapter 14: Local disaster risk reduction strategies and plans in urban areas

14.1 Significance of urban areas and local- level action in the 2030 Agenda

Developing urban resilience has been the subject of a global effort and is enshrined in a number of international frameworks – including the Sendai Framework, the 2030 Agenda and NUA – all of which recognize the importance of urban action by local and subnational governments to create inclusive, safe, resilient and sustainable human settlements.³⁷⁰ At the United Nations WCDRR in 2015,

local and subnational governments also committed to adopting local DRR strategies and plans, targets, indicators and time frames, as outlined in the Sendai Declaration of Local and Subnational Governments. This agenda recognizes the role of local governments as the primary, responsible authority during disasters, emphasizing the need for greater international collaboration with local and subnational governments.³⁷¹

The 2030 Agenda also recognized the importance of local-level action, particularly through SDG 11: To make cities and human settlements inclusive, safe, resilient and sustainable. The objectives of SDG 11 include: the enhancement by 2030 of

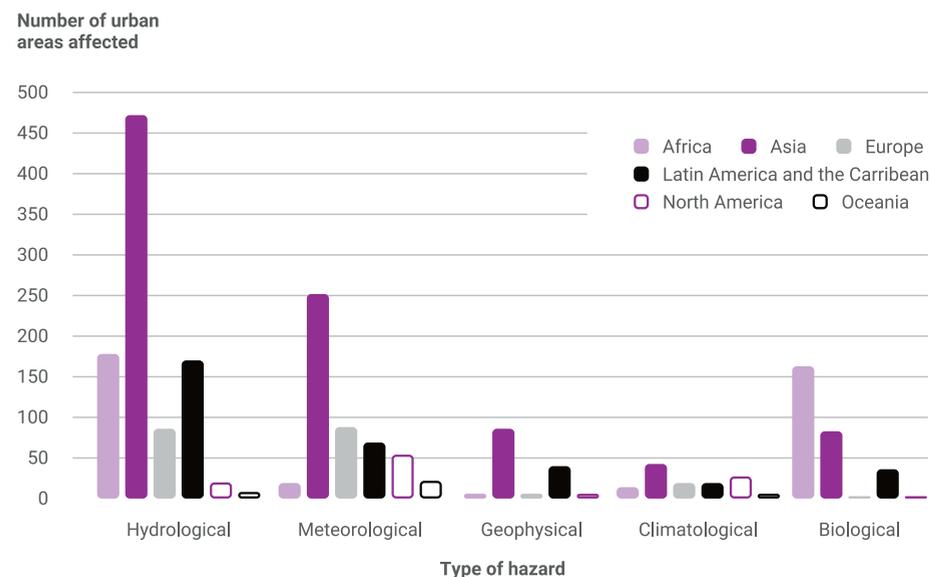
³⁷⁰ (United Nations 2015a)

³⁷¹ (Gencer and UNISDR 2017)

inclusive and sustainable urbanization and capacities for participatory, integrated and sustainable human settlement planning; to reduce deaths, number of people affected and direct economic losses caused by disasters, in particular water-related disasters, by 2030 with a focus on protecting the poor and the most vulnerable; and by 2020

to substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters and holistic DRM at all levels in line with the Sendai Framework.³⁷²

Figure 14.1. Number of urban areas with populations over 750,000 affected by disasters (1985–2015)



(Source: Gencer and UNISDR 2017)

The Paris Agreement also proposes a role for local governments. It welcomes the efforts of cities and local authorities, and invites them to “scale up their efforts and support actions to reduce emissions and/or to build resilience and decrease vulnerability to the adverse effects of climate change and demonstrate these efforts.”³⁷³

NUA brings together all these frameworks by proposing implementable actions in urban areas. In particular, in its section on Environmentally Sustainable and Resilient Urban Development, NUA recognizes that “urban centres worldwide, especially in developing countries, often have characteristics that make them and their inhabitants

especially vulnerable to the adverse impacts of climate change and other natural and human-made hazards.” NUA calls for national urban policies that commit to “strengthening the resilience of cities and human settlements, including through the development of quality infrastructure and spatial planning, by adopting and implementing integrated, age- and gender-responsive policies and plans, and ecosystem-based approaches in line with the Sendai Framework.”³⁷⁴ It also calls for mainstreaming data-informed DRR and management at all levels of government to reduce vulnerabilities and risk, and highlights that risk is present in areas of formal and informal settlements, including slums. An important element of NUA is that it aims to

“enable households, communities, institutions, and services to prepare for, respond to, adapt to, and rapidly recover from the effects of hazards, including shocks or latent stresses.”³⁷⁵

The availability of relevant geospatial and statistical information can assist countries to better understand, formulate policies on, and manage risk and impacts. For this reason, the United Nations Committee of Experts on Global Geospatial Information Management has developed the Strategic Framework on Geospatial Information and Services for Disasters.³⁷⁶ This approach offers urban areas and cities options for strengthening risk governance, enabling these localities to access and utilize nationally generated geospatial information as well as feeding local information back to the national level. This mitigates consistent challenges regarding the provision of geospatial information and strengthens informed decision-making and monitoring, before, during and after hazardous events.

14.2

Opportunities and benefits of local disaster risk reduction strategies and plans

For a local DRR strategy to be fully aligned with the Sendai Framework, it should be coherent with all the above-mentioned global frameworks, as well as being integrated into the development agenda for the relevant urban area or local government,

subnational or national territory. The importance of taking local-level actions to reduce current risk, prevent risk creation and increase cities’ resilience, is affirmed by Member States in adopting the post-2015 global agreements. However, the reality is that integrated implementation is not consistently pursued across countries or within States and regions. Nor do many national urban policies employ systems-based approaches to urban risk reduction.

Mainstreaming DRR strategies in urban development plans comes with distinct challenges, but also generates opportunities for sustainable development, potentially bringing economic benefits. Impacts of disasters are most immediately and intensely felt at the local level. Hazards often occur and risk often manifests locally; thus many of the most effective tools to reduce exposure and vulnerability, are executed at the local level; these include land-use regulations and enforcement of building codes, as well as basic environmental management and regulatory compliance that are essential for effective DRR. Governments and communities can best engage with each other and work together at the local level on DRR, but also in implementing sustainable development and environmental management.³⁷⁷

Some research suggests local governments are more likely to develop DRR strategies or undertake DRR and resilience building actions when these are absent or limited at national or regional government level. In an examination of climate-compatible development by subnational actors across Africa, Asia, and Latin America and the Caribbean by the Climate and Development Knowledge Network, it was found that “national governments may play a more passive role in creating enabling conditions through legal and policy frameworks that implicitly support climate-compatible development or, at least, do not undermine it.”³⁷⁸ It is

³⁷² (United Nations General Assembly 2015a)

³⁷³ (United Nations General Assembly 2015b)

³⁷⁴ (United Nations 2017b)

³⁷⁵ (United Nations 2017b)

³⁷⁶ (UN-GGIM 2017)

³⁷⁷ (Hardoy, Gencer and Winograd 2018)

³⁷⁸ (Anton et al. 2016)

still critical that national and subnational governments put in place and continuously upgrade, and enforce and incentivize, critical regulations, such as building and flood risk standards.

Productive interplay among different levels of government can be observed. For example, a review of DRM and climate resilience building in the United States of America over the last two decades found that the existence of multiple layers of government has “been an effective safety guard against any individual player’s potential unwillingness to undertake protective risk management or climate resilience building.” Where political will was lacking at state and regional levels, federal-level support combined with private sector initiatives and charitable foundations could make valuable progress, although “climate resilience building actions in the USA have been proven most effective at the city administrative level.”³⁷⁹

Successful initiatives at the local level can influence regional and even national level actions, creating a second or third wave of initiatives inspired by the original project.³⁸⁰ Evaluators of the United States Agency for International Development (USAID) Neighborhood Approach project across urban informal settlements in Latin America observed that some of the local projects funded by USAID generated multiplier effects at different levels. For example: a land tenure strategy in Jamaica that was defined by the NGO Habitat for Humanity is planned to be extended to the whole country and to involve other civil society organizations and institutions; an afforestation strategy for land-use management and DRR in Peru has been recognized internationally by FAO as good practice; and in Colombia, the Neighborhood Approach project reached out to the city’s communities and became part of an expanded municipal DRR approach.³⁸¹

Local-level DRR actions can be triggered by a disaster event that provides “a window of opportunity” for resilience building. The aforementioned Neighborhood Approach project has observed that several emergencies triggered by El Niño in 2017 in northern Peru had actually facilitated

the process of building disaster risk awareness in local authorities.³⁸² A similar assessment was made for DRM activities at the state level in India, where it was found that “[a] few States that encountered mega disasters have learnt from the catastrophes and developed systems and processes to deal with disasters”; however, “a few States that faced major disasters have not been so proactive in transforming the challenges into opportunities.”³⁸³ Hence, there are many other triggering factors and benefits for local governments to prioritize DRR and resilience as part of their development agenda.

Reducing disaster risk and building resilience can establish a leadership legacy; wherein strengthened trust in, and legitimacy of, local political structures and authority, and opportunities for decentralized competencies and optimization of resources, emerge. Developing sociocultural gains while simultaneously reducing disaster losses and sustaining economic growth can provide positive assurance for investors. Developing more liveable communities with balanced ecosystems, better urban planning and design, and active citizen participation can create a successful platform for urban governance. Finally, the development of an expanded knowledge base with growing access to an expanding network of cities and partners committed to DRR can increase resilience through the exchange of practices, tools and expertise.³⁸⁴

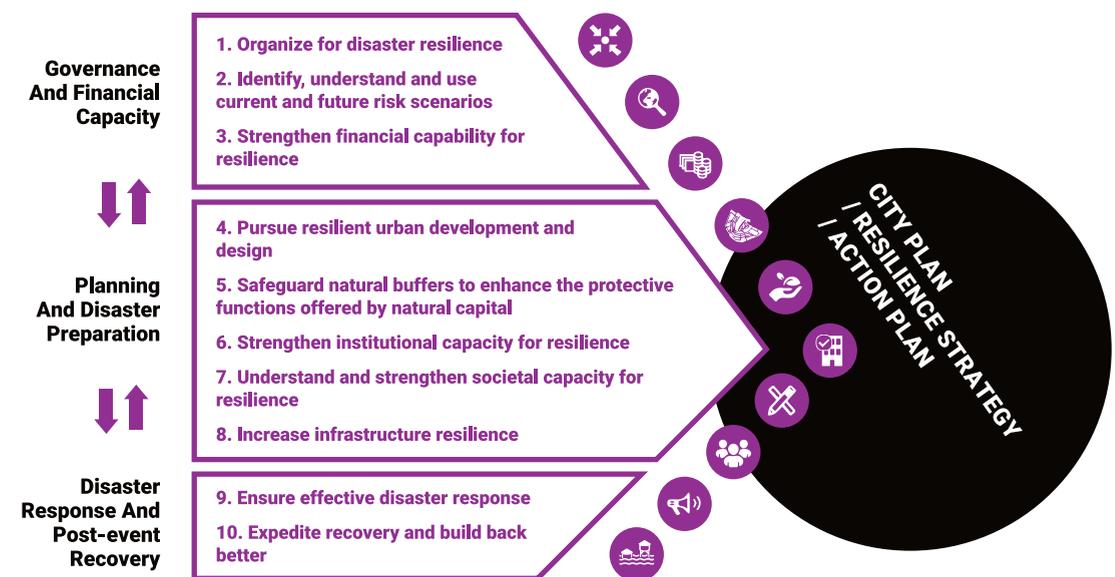
A research project that highlights the fundamentals of successful collaborative networks and their relevance to developing the New Zealand Resilience Network underscores the significance of global networks to share knowledge and resources. Through an assessment of the level of resilience in the seven largest cities in New Zealand, it was found that the larger, more dynamic cities of New Zealand – which included two member cities of the Rockefeller 100 Resilient Cities Programme – were “well informed, have resilience plans and prioritized projects related to enhancing their resilience, and secured the financial, human, and other resources required.”³⁸⁵ While the study also noted that other small cities had more dispersed resilience initiatives, some of

these were rated as “robust and effective”.³⁸⁶ This once again demonstrates the importance of adopting flexible, context-specific approaches to local risk reduction, especially where local capacities are limited and resources scarce. This learning is transferrable to urban contexts in developing countries, where a more practical and adaptive approach may be needed to achieve outcomes, rather than assuming that a complex and centralized planning and strategy process is the best option.

Making Cities Resilient project analysis – an example

Following the adoption of the 10 essentials of the MCR Campaign, UNISDR and partners developed a Disaster Resilience Scorecard. It aims to support cities in assessing their resilience and facilitate the development of local DRR strategies. Analysis of scorecards of 169 MCR Campaign cities revealed that most progress had been made in *Essential 4: Pursue resilient urban development and design*,

Figure 14.2. Ten new essentials of the MCR Campaign used to develop local DRR strategies and plans



(Source: UNISDR 2017)

including risk-informed urban planning and design, land-use planning and management, development and enforcement of building codes. Of the 169 cities, 51 were in Asia, 48 in Africa, 50 in the

Americas and 20 in the Arab region.³⁸⁷

The analysis also found that *Essential 3: Strengthen financial capacity for resilience* scored the lowest

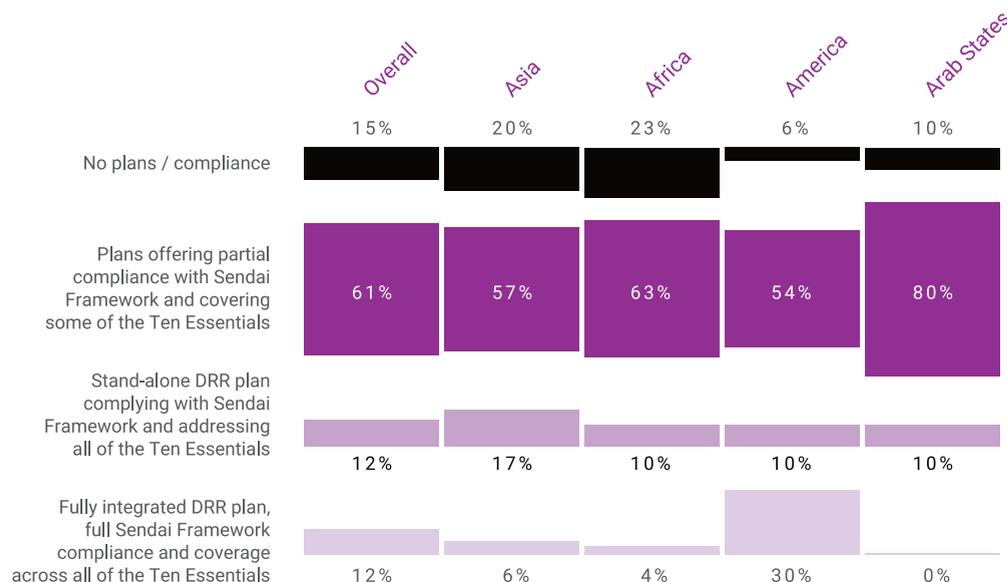
379 (Gencer and Rhodes 2018)
 380 (Sarmiento et al. 2019)
 381 (Sarmiento et al. 2019)
 382 (Sarmiento et al. 2019)
 383 (Chakrabarti 2019)

384 (UNISDR 2012)
 385 (Elkhidir, Wilkinson and Mannakkara 2019)
 386 (Elkhidir, Wilkinson and Mannakkara 2019)
 387 (UNISDR 2018b)

across the regions; financial allocations did not encourage local governments to include DRR in their planning and implementation – “securing a substantial budget for DRR is a significant challenge for most of the cities.”³⁸⁸ Despite such budgetary constraints, 85% of the local governments included in the study have plans that offer full or partial compliance with the Sendai Framework, and cover some of the 10 essentials for MCR.

However, only 12% of the local governments implement a fully integrated DRR plan in accordance with the Sendai Framework, incorporating all of the 10 essentials; 15% of the local governments have no plan at all (see Figure 14.3). The question remains whether such plans can be implemented with little or no budget, or if they will remain aspirational without substantial financial allocations from either national or local city revenues.

Figure 14.3. State of local DRR plans as reported by the 169 cities of the MCR Campaign



(Source: UNISDR 2019)

14.3 Design, development and implementation challenges of local disaster risk reduction strategies and plans

As the above analysis shows, the percentage of cities with DRR plans that are fully compliant with the Sendai Framework and the 10 essentials of the MCR Campaign is still low. One of the reasons is that the provision of clear mandates regarding DRR is still a challenge for many local governments. Decentralization of powers and vertical integration of risk governance among national and local authorities remains limited. This is compounded by a lack of tools to improve the quality of disaster-related decision-making; for systems analysis

(simulation, optimization and multi-objective analysis) for example. Officials charged with managing urban areas need a complete, holistic understanding of physical system dynamics of disaster-affected areas and adjacent regions. Equally, insights into the variables that govern the interactions among human (people and economy) and natural (water, land and air) systems, and the built environment (buildings, roads, bridges, etc.) in particular, are much sought after.

As regards the level of authority, capacities and responsibilities that local governments possess

for activities related to the 10 essentials, only 46.7% of surveyed governments have full authority and capacity to undertake the 13 DRR actions identified at local level (see Box 14.1), 39.7% have partial powers (limited or distributed among other institutions) and 13.5% have no powers to undertake these actions.³⁸⁹ In many instances, local governments have partial or no responsibility to develop a city vision or strategic plan; 1 in 10 of those assessed had no responsibility whatsoever, rather the responsibility is divided among multiple institutions.

Box 14.1. DRR actions that indicate local government powers and capacities

- a. Developing a city vision or strategic plan with concepts of resilience
- b. Establishing a single point of coordination for DRR
- c. Undertaking risk analysis for multiple hazards
- d. Developing financial planning for resilience
- e. Developing and updating urban plans with up-to-date risk information
- f. Updating building codes and standards and enforcing their use
- g. Protecting, conserving and restoring ecosystems for resilience
- h. Developing a critical infrastructure plan or strategy for resilience
- i. Strengthening institutional capacity for resilience
- j. Identifying and strengthening societal capacity for resilience
- k. Developing a disaster management and/or emergency response plan and protocols
- l. Developing or ensuring connections to EWSs
- m. Developing a strategy for post-disaster recovery and reconstruction that ensures building back better

(Source: Gencer and UNISDR 2017)

Shared responsibilities for the development of a city vision or strategic plan is not uncommon. For example: in Sendai city (Japan), the national government and the prefectural governments share responsibilities for the city vision and plan; in Makati city (Metro Manila, Philippines), the local authority, metropolitan bodies and national government agencies share responsibilities for planning and development; and in Honduras and the Bolivarian Republic of Venezuela, the central

government is the primary body responsible for the development of a city vision or strategic plan.³⁹⁰ From the city government perspective, this may be experienced as a lack of adequate powers at local

³⁸⁸ (Amaratunga et al. 2019)

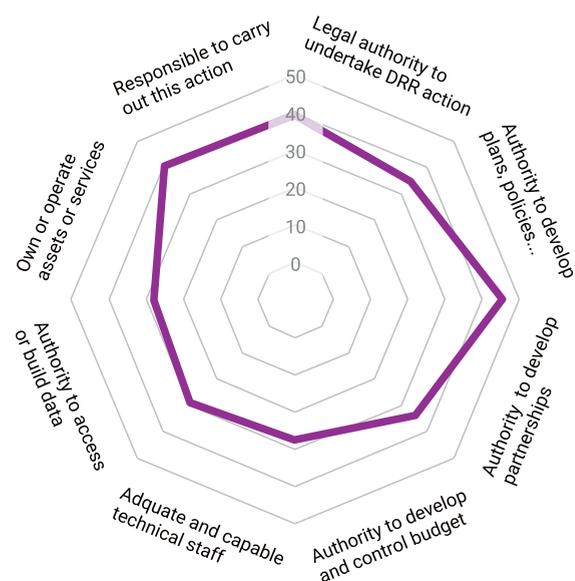
³⁸⁹ (Gencer and UNISDR 2017)

³⁹⁰ (Gencer and UNISDR 2017)

level, as emphasized in the Urban Climate Change Research Network Second Assessment Report on Climate Change and Cities, which pointed to important gaps between national policies and city government needs, particularly in small countries, where authority to intervene mostly lies at the national level.³⁹¹

Figure 14.4 illustrates local governments' overall authorities, capacities and responsibilities for DRR from the same study, demonstrating that the authority to plan for DRR, and even the legal authority to carry out the necessary actions, was not matched by the resources and capacities for implementation.

Figure 14.4. Local government authorities, capacities and responsibilities for DRR (% full authority, capacity and/or responsibility)



(Source: Gencer and UNISDR 2017)

Even where local governments have the relevant authority to develop DRR strategies or manage risk, limited capacities and resources hinder implementation. For example, the capacity to update and enforce the use of building codes and undertake multi-hazard risk analysis is frequently lacking.³⁹² Climate-compatible development actions of subnational authorities suffer similar issues, where “there is often disparity between the need for political and financial authority, resources, and capacity to respond to climate-related challenges at the subnational level, and the actual power, resources, and capacity available”.

This is commonly a function of partial or unclear devolution of power, a lack of clear delegation or vertical integration.³⁹³

Many local administrations do have clear authority for specific DRR actions that are part of long-established municipal activities, such as developing urban plans. However, for activities such as ecosystem preservation and restoration, which are traditionally the responsibility of the environmental, regional or subnational authorities, legal authority for local governments tends to be limited.³⁹⁴

Lack of coordination among horizontal and vertical agencies and sectoral silos can therefore exacerbate limitations on the powers of local governments to actively pursue DRR and resilience building. Such coordination is particularly important in addressing risks that span administrative and systems boundaries – environmental risks for example – where effective cooperation is essential.³⁹⁵ In essence, tackling urban risk requires a systems thinking approach to risk governance. This is a challenge for most national and local administrations, as it requires new approaches and tools to support vertical and cross-sectoral integration.

Inadequate coordination and interactive stakeholder partnerships can impede knowledge acquisition and management in local governments. A project on Participatory Decision Making for Climate Resilient Development in three cities across Latin America found that there was adequate information and data available in the three cities to start carrying out vulnerability and risk assessments, despite prior assumptions to the contrary. The challenge was that the information was held by different actors – government offices, academic and research centres, and international organizations – and the difficulty lay in accessing data and information.³⁹⁶ There were conflicting regimes for data verification and often incompatible formats that made it difficult to share information among institutions and actors. Consequently, local governments could not access the technical capabilities to generate and process the information they needed.³⁹⁷ In addition to information gaps, other impediments to local DRR actions include the lack of technical capacity and training, and difficulties in assembling the

technical-political teams with the right profile to influence decision-making.³⁹⁸

Budgetary constraints represent the biggest challenge to local DRR and climate adaptation. To overcome this obstacle, it is important to be able to demonstrate in each context that ex ante DRR is a better use of scarce resources than the alternative of responding after damage and disruption occurs.³⁹⁹ Mobilizing private funding without the backing of national governments is still proving to be a major challenge for medium to small subnational entities.⁴⁰⁰ Investments that can reduce risk and increase adaptive capacity are often not prioritized, while benefits may only show at a later stage and are thus heavily discounted.⁴⁰¹ The creation of national and local urban policies including DRR are critical for long-term economic success, competitiveness and resilience. However, short mandates and recurrent elections, deadlines of political agendas and urgencies of daily management can militate against such long-term systems thinking. The common corollary being a lack of investment in strengthening technical and professional capacities, and the failure to plan and work over the longer time frames required for resilient urban development planning.⁴⁰²

14.3.1

Disaster-risk-informed city vision and sustainable growth strategy

It is often in the aftermath of major disaster events that the impetus to adopt city-wide approaches to DRR become apparent, as was the case in New York City following Hurricane Sandy.

³⁹¹ (Gencer et al. 2018)

³⁹² (Gencer et al. 2018)

³⁹³ (Anton et al. 2016)

³⁹⁴ (Anton et al. 2016)

³⁹⁵ (Anton et al. 2016)

³⁹⁶ (Hardoy, Winograd and Gencer 2019)

³⁹⁷ (Hardoy, Winograd and Gencer 2019)

³⁹⁸ (Hardoy, Winograd and Gencer 2019)

³⁹⁹ (Gencer et al. 2018)

⁴⁰⁰ (Anton et al. 2016)

⁴⁰¹ (Gencer et al. 2018)

⁴⁰² (Hardoy, Winograd and Gencer 2019); (Anton et al. 2016); (Gencer et al. 2018); (Maurizi et al. 2019)

Case study: New York City

In 2013, after Hurricane Sandy, New York City released PlaNYC: A Stronger, More Resilient New York, which documented the lessons learned from Sandy, and developed a strategy to build back better and achieve resilience towards the impacts of climate change, including risk from rising sea levels and extreme weather events.⁴⁰³ In 2015, the city launched the latest city vision document, OneNYC: The Plan for a Strong and Just New York City, which was developed in partnership with the Rockefeller 100 Resilient Cities project. OneNYC cites “sustainability” as a cornerstone, stating that New York City will be the most sustainable big city in the world and a global leader in the fight against climate change. It also cites “resiliency”, ensuring that New York’s City’s neighbourhoods, economy and public services will be ready to withstand and emerge stronger from the impacts of climate change and other twenty-first century threats.

Within its vision of being a resilient city, New York City has made significant progress in terms of neighbourhood resilience. Since 2015, it has supported resilience and preparedness planning of community and faith-based

organizations and small businesses, and promoted volunteer and civic engagement across the five boroughs, to address risks from heat-waves and rising temperatures. It has provided small businesses with training, technical assessments and preparedness grants to enhance their resilience. In terms of resilience of buildings, since Hurricane Sandy, the city has led efforts to adapt the existing building stock to evolving climate risks through a multi-layered approach, including upgrading of physical systems in family homes and multifamily buildings, changing zoning and land-use policy, working with FEMA to produce more accurate maps, and educating building owners about climate risk and mitigation options. The city continues to address Hurricane Sandy’s impacts on its infrastructure, protecting its power, transportation and water systems, while also addressing emerging risks, such as extreme rainfall, through resilient design. The city has also advanced numerous coastal defence projects since 2015. In coordination with community stakeholders, it has sought to deliver cutting-edge flood risk mitigation solutions that are integrated into the urban fabric of neighbourhoods and provide co-benefits such as recreational space wherever possible.

New York City’s vision provides the basis for coherent, convergent approaches pursuing sustainability, climate adaptation and resilience, and provides a road map for implementation of specific strategies and initiatives.

14.3.2

Challenges and opportunities in developing disaster risk reduction strategies in different regions

To speak of the urban implies cities, and there is a wide range of characteristics that fall under this

subject. These include administrative limits, size of population, density, contiguous urban areas and their socioeconomic interconnections, governance mechanisms and resources. For the post-2015 DRR agenda, there is no particular approach in the Sendai Framework, NUA, Paris Agreement or SDGs that contemplates the different conditions that exist in the broad spectrum of cities and city contexts. For NUA, the risk management regime considers cities with respect to income (low and high) and does not consider the cities’ typology or the implications of the size of the city and its population. These are critical conditions however for those developing countries that experience a steady increase in the size of small- and medium-sized cities.⁴⁰⁴

According to The World’s Cities in 2018 report, an overwhelming majority of the world’s cities have fewer than 5 million inhabitants. Among these, 598 cities have populations between 500,000 and 1 million; 467 cities have populations between 1 million and 5 million; 48 cities have populations between 5 million and 10 million; and 33 cities have more than 10 million inhabitants (megacities). The

projected numbers for 2030 show an exponential increase: 710 cities are expected to have between 500,000 and 1 million inhabitants; 597 cities with 1 million to 5 million inhabitants; and 66 cities will have between 5 million and 10 million inhabitants, of which 13 will be located in Asia and 10 in Africa. The number of cities with more than 10 million inhabitants is projected to increase to 43.⁴⁰⁵



View of Mogadishu
(Source: MDOGAN/Shutterstock.com)

To understand the challenges and opportunities in developing DRR strategies, it is also important to recognize the significant differences in the character of urban environments around the globe. For example, in the Arab and North Africa region, there is a growing number of large agglomerations with populations of more than 1 million people. These are expected to reach 18 by 2030, accounting for 24% of the total population of 128 million people in the region.⁴⁰⁶ The urban context, and thus

vulnerability and risk in the region, are defined by unique aspects of demographics, sociopolitical and economic development. Such aspects include the increased flows of refugees and migrants; the region has the largest global number of IDPs, at 17.3 million. Urban slums are not a significant feature in the Arab and North Africa region as a whole, but certain countries in North Africa have very high levels of informal settlement. For example, in Sudan, the share of the population living in poor

⁴⁰³ (Gencer and UNISDR 2017); (City of New York 2011); (City of New York 2018)

⁴⁰⁴ (Garschagen et al. 2018)

⁴⁰⁵ (UN DESA 2018a)

⁴⁰⁶ (Eltinay and Harvey 2019); (UNDP 2018d)

informal settlements is 91.6%, in Mauritania, it is 79.7%, and in Somalia, it is 78.6%.⁴⁰⁷

Many of the cities in the Arab and North Africa region are subject to hydrometeorological and geophysical hazards. The complex nature of the evolving risk landscape is most articulated in coastal areas, which are particularly susceptible to flooding, as well as seismic and climate risks. Due to highly arid conditions, the region is one of the most vulnerable to climate change, putting cities at risk of water scarcity and extreme heat conditions. With these complex conditions, building resilience through developing strategies and plans to reduce risk in the cities of the Arab and North Africa region has become more essential than ever.

A comparative analysis of 25 Arab region cities' resilience assessments identified trends and investigated challenges and opportunities for implementing the Sendai Framework in the Arab region at the local level.⁴⁰⁸ Of the 25 cities that participated in this study, 18 of them (72%) had a city master plan or relevant strategy in place that were in partial compliance with the Sendai Framework and covering some of the 10 essentials. However, it was found that the "underlying risks of humanitarian crisis and disasters challenge the process of building resilience in the Arab region, combined with the lack of coping capacities when faced with climate change, conflict, and displacement."⁴⁰⁹

Another impediment to the development of DRR strategies and plans in the Arab and North Africa region is the lack of disaster-related data. City-wide hazard maps are often limited or do not exist, while updates on risk assessment are scarce and lack clear multi-hazard components, according to a recent assessment.⁴¹⁰ This challenge is often linked to disaster risk governance, when the legal framework fails to require the maintenance and updating of disaster data. Given the complex risk environment in the region, it is of paramount importance that urban DRR strategies are based on sound risk information, to ensure that implementation prioritizes the most at-risk population and assets. These challenges must be addressed in the near term in relevant cities, if city master plans that already exist are to be successfully realized.

14.3.3

Collaborative, integrated and holistic resilience building

Resilience building is not something that can be undertaken effectively by local government authorities acting alone. The process undertaken in Maputo, Mozambique, illustrates the benefits to all of broad stakeholder and cross-sectoral engagement.

Case study: Maputo, Mozambique

Mozambique is undergoing a process of rapid urbanization.⁴¹¹ While 32% of the nation's population can be considered as living in "urban areas", this percentage is projected to rise to 37% by 2020. By 2025, Mozambique is projected to be the fourth most-urbanized country in sub-Saharan Africa, with 50% urban dwellers. The Mozambique National Statistics Institute puts the population of the capital Maputo at over 1.273 million people. This poses enormous challenges for

the local government in its efforts to deliver basic services, provide food and improve the city's infrastructure, which creates enormous vulnerabilities and exposure to risk.⁴¹²

Maputo is the largest city in Mozambique and the main financial, corporate and commercial centre of the country. Located on the western shore of Maputo Bay, the city is close to the triple border of Mozambique, South Africa and Eswatini (formerly known as Swaziland). As a function of its location, exposure to natural hazards – notably flooding and cyclones

– is high, and expected to worsen as climate change brings sea-level rise. Maputo was fortunate on this occasion to have avoided the loss and damage wrought by Cyclone Idai in March 2019 on the city of Beira and large areas to its west, where the vulnerabilities of the city and surrounding region were laid bare (see section 13.4.5).⁴¹³

Changing rainfall patterns and the reduction of river flows are expected to lead to the decrease of soil water recharge and availability of surface water. Of the total population, 70% live in informal settlements, resulting in major urban challenges and widespread and entrenched vulnerabilities as a result of economic crises and unemployment.

In 2010, the World Bank and the National Disaster Management Institute identified Maputo Municipality as one of the most risk prone in Mozambique. Since then, the municipality has collaborated with international initiatives and programmes to better understand and tackle the various shocks, stressors and challenges in the city, especially those related to climate change. One of the flagship initiatives is the City Resilience Profiling Tool (CRPT), which was launched in 2017 and will continue through 2019, with the goal to better understand urban hazards, and their impacts on inhabitants and functionality through in-depth data collection, resilience analysis, identification of key actors and development of priority actions.

Through the metrics provided in CRPT, Maputo has been able to conduct an analysis of its data along a resilience baseline. The result is the city's own "resilience profile", which

highlights vulnerabilities, risks, data gaps and capacity bottlenecks. In Maputo, initial analysis has indicated that epidemics and pandemics such as malaria, natural hazard risks such as heat-waves, floods, drought and tropical cyclones, and environmental risks such as coastal erosion are the most pressing for the city. Although these risks may not be "new" to the city, through CRPT, the city has an evidence base to support action and an in-depth understanding of pressure points, stressors and key actors that should drive transformational and sustainable change.

By providing robust guidance and assistance in creating a policy to be called Actions for Resilience, the CRPT process is attracting resources and other support to the local government to improve decision-making and to contribute to long-term, resilience-based sustainable urban development.

To build on the stakeholder engagement developed throughout implementation, the Actions for Resilience will be finalized through a dialogue among city officials and relevant stakeholders. Furthermore, as the data collection, analysis and diagnosis stages take into account ongoing plans, policies and programmes in the city, the resulting Actions for Resilience in Maputo will be more easily integrated into existing urban development strategies as opposed to an isolated resilience action plan that might not be joined with other initiatives in the city. This process will allow integration with the Ecosystem Based Adaptation Plan and the Metropolitan Transport Project, as well as relevant new policies, plans and agreements that are currently being developed at the municipal level.

407 (UNDP 2018d)

408 (Eltinay and Harvey 2019)

409 (Eltinay and Harvey 2019)

410 (Eltinay and Harvey 2019)

411 (Case study based on information from UN-Habitat City Resilience Profiling Programme; UN-Habitat n.d.)

412 (Mozambique 2010); (Instituto Nacional de Estadística 2019)

413 (UN News 2019)

Maputo's approach to building city resilience is work in progress, but the highly engaged process has provided a strong base for a new policy, and has been successful in attracting resources and other necessary support to the local government.

The resulting disaster resilience policy will be more easily integrated into existing urban development strategies and more readily implemented, because of the multi-stakeholder and cross-sectoral process.



A view of Maputo
(Source: hbpro/shutterstock.com)

14.4

Enabling factors for developing and implementing local disaster risk reduction strategies and plans

The previous section identified that one of the most important underlying factors for the successful design, development and implementation of

urban DRR strategies and plans is sound risk governance. Commitment of a local government lead with a clear mandate and the necessary authorities is the first step to local-level DRR action. However, urban risk governance is a more complex than merely having the necessary legislation and institutions in place, it requires broad participation for effective implementation.

Risk governance at the urban scale brings forth DRR stakeholder participation at all levels, from decision-making to design and implementation, and incorporates formal and informal urban contexts. It is conducive to the success of local-level DRR action and the development and implementation of local DRR strategies and plans in urban areas. Such urban risk governance will also

be coherent with the 2030 Agenda as it facilitates inclusive and sustainable urban development.

A facilitating factor for the development, design and implementation of DRR strategies is access to adequate information, resources and technical capacity to process risk-related information to mainstream into risk assessments and risk-informed development planning. While capacities are often very limited at local government levels, they can be enhanced by tapping into resources of the private sector, academic and research organizations, and civil society, provided their data are evidence based and streamlined in a format for easy use by local governments. Risk information needs to be generated through a “participatory and inclusive approach in generating, improving and managing information” including risk-related geospatial information, which should be used by all entities engaged in DRM efforts.⁴¹⁴

Another critical factor for the successful development and implementation of local DRR strategies and plans in urban areas is the strength of planning institutions and norms in that locality. The role of planning is indispensable for mainstreaming DRR into urban development plans. The aforementioned study of the USAID Neighborhood Approach project across informal settlements in Latin America found that it was the local governments that had the more comprehensive urban development capabilities that were most able to foster cross-sectoral integration and to mainstream DRR practices in urban development.⁴¹⁵

Various types and scales of urban plans, from territorial to land-use zoning, can help to protect environmentally sensitive areas, and hence increase resilience. They can: reduce disaster risk through better planned infrastructure and the creation of open spaces; reduce vulnerability through appropriate location of housing and

other critical services; mitigate climate change by ensuring optimum use of energy and reducing GHG emissions; and improve resilience by ensuring upgrading and retrofitting of poorly planned and constructed settlements, ideally through a participatory process that will ensure implementation and sustainability.⁴¹⁶ Furthermore, the consideration of innovative planning and design ideas such as urban green growth strategies, transit-oriented design, creative open and public space development, and the use of green and blue infrastructure can help to reduce risk in urban areas while improving living conditions and driving cities towards sustainable and resilient development.⁴¹⁷

An example comes from China's Sponge City Programme, which has established methods for flood risk reduction, water conservation, improved water quality and reduction of heat island effects by using ecological infrastructure. Run-off water volumes are reduced by preservation and restoration of green spaces over hard impervious surfaces, which also reduces day- and night-time temperatures. There are cultural, ecological and health benefits too, which all help to build community resilience.⁴¹⁸

Implementation of risk-sensitive planning can help reduce the risk in established informal and slum settlements, and the provision of suitable land for housing for all income groups can also reduce the growth of informal settlements. Given the presence of informal settlements in many rapidly urbanizing cities, participatory slum-upgrading practices may be a prerequisite for DRR and resilience building in these areas if it is not immediately possible to offer suitable land, infrastructure, and services to meet the needs of populations moving from impoverished rural economies, or as a result of conflict and crises.⁴¹⁹

⁴¹⁴ (UN-GGIM 2017)

⁴¹⁵ (Sarmiento et al. 2019)

⁴¹⁶ (Johnson et al. 2015)

⁴¹⁷ (Bendimerad et al. 2015)

⁴¹⁸ (Lenth 2016)

⁴¹⁹ (Bendimerad et al. 2015)

An enabling factor for local DRR strategies in urban areas is developing an understanding of emerging risks, aided by developments in systems and systemic risk modelling, which allow the development of context-specific approaches in local DRR strategies and planning from neighbourhood to city and territorial level. Such approaches must be backed up by the enforcement and updating of national codes and standards as part of national urban policies.

14.4.1

Participatory development of strategies for climate-resilient and inclusive urban development

Climate-resilient and inclusive urban development that involves government, community and private sector actors can be effective in managing disaster risk and addressing governance issues in cities, as was the case in Santo Tomé, Argentina.

Case study: Santo Tomé, Argentina

Santo Tomé in Argentina is a rapidly growing small- to medium-sized Latin American city. It is prone to natural hazards and the impacts of climate change and is attempting to implement climate-resilient and inclusive urban development to strengthen its resilience.⁴²⁰

Santo Tomé is located in the province of Santa Fe and is part of the Greater Santa Fe Metropolitan Area in Argentina. Within the last decade, the city has experienced rapid population growth of 12%, almost twice the provincial average, a rate that is expected to grow further by 2025. Due to its location at the mouth of the Salado River, the city is prone to flooding; most exposed are the city's informal settlements. The city has developed a system of defences and pumps, which are reaching their limit in terms of protection. Urban growth without adequate risk planning and inadequate infrastructure and services has led to an increase in disaster risk in the city.

A diverse group of actors including local government representatives, hydraulic engineers, officials of public works and services, urban planning, social development, health and environment, as well as civil society organizations identified the need to develop a risk information system and improve communication among local actors. They also recommended advancing a DRM plan within the urban planning process, and in the expansion and completion of infrastructure and services so that they reduce risks.

Priority actions taken cover a diverse range. They include: the strengthening of the solid waste collection system to reduce the obstruction of drains and environmental risks; education campaigns and capacity-building for local actors in DRM, climate change and resilience issues; improved flood control infrastructure, city mobility, water infrastructure and water management and the incorporation of green infrastructure options based on existing norms.

The case of San Tomé highlights the diversity of actors and scope of activities that may be needed when taking a systems-based approach to developing and implementing an integrated urban resilience plan.

The case study of Dar es Salaam, United Republic of Tanzania, that features prior to Part III, also highlights the importance of participatory approaches from a wide range of stakeholders to address urban risk across a range of sectors, levels and timescales. It involved a range of stakeholders, including local and national

government, civil society, scientific and technical experts, communities and students, as well as diverse implementation activities, including participatory risk mapping, use of geospatial data and public education.

14.4.2

Downscaling local resilience and sustainable development through multiscale and multilevel holistic approaches

Support for greater city resilience can also be initiated at provincial level, as in the province of Potenza, Italy.

Case study: Province of Potenza, Italy

The province of Potenza is an Italian Local Authority of super-municipal and subregional level. It comprises 100 municipalities in its territory and is exposed to a variety of natural and technological hazards.⁴²¹ In 2013, the province outlined the #weResilient strategy aimed at pursuing territorial development through a structural combination of environmental sustainability, territorial safety and climate change policies.

A milestone in the #weResilient strategy is the Provincial Territorial Coordination Master Plan (2013). It has been delivered to the community as an important document for guiding and addressing governance of provincial territorial development and represents a "structural" tool for analysing needs and driving local governments' choices with a wide-area strategic point of view and a multiscale and multilevel holistic approach. A new concept of territorial governance has been outlined that includes the structural introduction of "resilience" to disasters and climate change into territorial development policies and which are to be implemented through specific actions at local and urban levels.

A fundamental aspect of the #weResilient implementation strategy is to build on active

participation of communities in local decision-making processes in territorial policies, and to assist and support municipalities. This ensures that specific urban/local strategies and actions are integrated into the general framework of #weResilient on sustainable and resilient territorial development.

The signatory municipalities are committed to integrating more focused sustainable development and community resilience within urban planning and related actions, including in other relevant sectors. By downscaling the model proposed by the province of Potenza, and with its support, these municipalities are locally implementing a multi-stakeholder approach. This is based on the active involvement of local institutions, organizations and associations representing different professional and social categories, to give them the opportunity to become driving forces reducing disaster risk. These municipalities are engaged in clustering processes with key community actors across all sectors. They are also looking at working with the concept of social categories, experimenting with the use of concrete plans/actions to transform different social groups into forces for developing and implementing safe and sustainable urban policies. Through these different techniques, the approach is one of local engagement to generate new models of urban planning that work from the bottom up.

⁴²⁰ (Hardoy, Winograd and Gencer 2019); (Hardoy, Gencer and Winograd 2018)

⁴²¹ (Attolico and Smaldone 2019)

The example of the province of Potenza and its development of a Provincial Territorial Coordination Master Plan, demonstrates how a large group of municipalities in a region with common risks and challenges can achieve resource efficiencies and mutual capacity-building, using innovations such as clustering, and downscaled modelling from the provincial to city level.

14.5

Conclusions

Given the complex and dynamic nature of urban risk, and especially given current projections for rapid urban growth in developing economies, a focus on urban areas and local-level action is central and urgent to achieve inclusive, resilient and sustainable communities as understood in the Sendai Framework, the 2030 Agenda, the Paris Agreement and NUA. These global frameworks give prominence to the importance of urban risk reduction actions, and strategy and policy development. They reflect Member States' clear understanding that, without risk-informed planning, human lives will be in danger, assets will be exposed and development gains will be lost, and that this risk is especially acute in urban areas. More than half the world's population currently lives in urban environments, a figure that is projected to grow dramatically in the coming decades. Unplanned urban development that is undertaken without appropriate commitment to transdisciplinary, multi-risk assessment and systems-based approaches in developing solutions could result in critical increases in vulnerability and exposure to both existing and new risks.

There are sound socioeconomic and ecological reasons for national governments to create national urban policies that include support for the development and implementation of national and local risk reduction strategies and plans in urban areas. It is in the interests of local authorities to develop and implement local and urban DRR strategies that, in addition to context-specific benefits, also create a legacy of leadership based on trust and legitimacy of the local political structures and authority, so that civil society, the private sector, scientific and technological institutions and development partners continue to engage. Local and urban DRR strategies safeguard sociocultural gains, and can promote social equality (including along gender lines), substantially reducing losses and sustaining economic activity while assuring investors that the environment is safe and reliable.

Local strategies also present opportunities for decentralized competencies and optimization of often scarce resources. As seen earlier, cities with limited resources and capacity often ignore risk, but may do so once forced to confront the consequences of disaster. As has often been observed, disaster recovery may also present opportunities to integrate risk reduction in future development processes, as governments may use these situations as "triggers to increase the understanding of the risks and to mainstream the DRM approach in different sectors of development."⁴²²

Collaboration in global initiatives creates a knowledge base with a growing access to an expanding network of cities and partners committed to DRR and resilience building with the possibility of exchange of practices, tools and expertise.⁴²³ However, despite increased awareness and obvious benefits of developing local DRR strategies and plans, many cities are still not progressing significantly regarding design, development and implementation of DRR actions.

Local governments experience a multitude of challenges that hinder the advancement of DRR and resilience building. The lack of sufficient authority for city governments, inadequate budget allocations and limitations in technical capacity, are

comment and prominently cited concerns. Mobilizing private funding without the backing of national governments remains a major challenge for medium to small subnational entities.⁴²⁴

In terms of risk information gaps, the lack of coordination among horizontal and vertical agencies and stakeholder partnerships, as well as sector silos, seems to be the greatest impediment to addressing the knowledge deficit and enhancing capacities for DRR in local governments. This must be overcome, not least at the critical stage of designing DRR strategies and action plans when sharing data is key.

One of the biggest challenges for local DRR is to make the investment case; to convincing national and local government authorities and communities faced with limited resources and competing needs that it pays to invest in risk reduction because recovery and reconstruction costs more. The short-term nature of political process and cycles compounds this dilemma.

To overcome some of these challenges, three main enabling factors have been identified that support the development and implementation of local and urban DRR strategies.

Sound urban risk governance: Governmental structures, laws and policies need to support horizontal governance in providing stakeholder engagement and integration across sectors, within the city boundary and beyond with neighbouring counties and cities. This also applies to vertical governance that strengthens the downscaling of development efforts with international, regional and national entities and frameworks. Such urban risk governance should incorporate formal and informal contexts, bring forth public participation at all levels starting from data collection, assessment and decision-making to facilitate context-relevant design and implementation of local DRR strategies and plans, particularly regarding issues that concern the most vulnerable populations. Such urban risk governance will also be coherent with other development frameworks as it facilitates inclusive and sustainable urban development.

Local participation strategies can also advance capacity and resource gaps by the inclusion of academia and research, as well as private sectors, in the process of resilience building.

Sustained use and application of risk information: Evidence-based risk data needs to be easy to identify and locate by local governments, even if its collection is dispersed through different governmental entities, or located within the academic or private sector. Ease of application in decision-making is also key; case studies have shown the success of generating geospatial data through participatory techniques and attaining such data in a streamlined manner in local government settings.

Risk-informed urban planning and development: This is found to be another indispensable enabling factor for the success of local DRR strategies and plans. The integration of hazard and risk information in urban planning, design and construction should be reinforced by relevant laws, regulations and guidelines, which should be updated on a regular basis. Risk-informed urban planning requires meaningful stakeholder participation, particularly when urban development processes, such as those that fail to provide access to critical infrastructure and services, can increase the vulnerability of urban populations. In the rapidly developing urban regions of Africa, Asia and Latin America where the absolute number of residents of informal settlement are growing with populations moving in increasing numbers from impoverished rural economies, industrial relocation, conflicts and crises, there is a need to understand emerging risk. This means involving the most vulnerable stakeholders in the planning processes, such as in participatory slum upgrading, and developing context-based approaches in local DRR strategies and planning, which may be applied at neighbourhood, city and territorial levels. It is also increasingly understood that integrating ecological infrastructure into resilient urban land-use planning has multiple benefits in reducing risk reduction, providing a cleaner water supply, reducing peak summer temperatures, and improving health and well-being.

⁴²² (Maurizi and Fontana 2019)

⁴²³ (UNISDR 2012)

⁴²⁴ (Anton et al. 2016)

Sound urban risk governance frameworks informed and bolstered by more readily available and more easily applicable risk information – supported by emerging capabilities in systems and systemic risk modelling – will be of crucial importance to enable effective, context-specific design, development and implementation of local DRR strategies and plans. Such approaches to building resilience in urban areas can be transformative, empowering communities and ensuring inclusive and sustainable urban development.

Chapter 15: Disaster risk reduction strategies in fragile and complex risk contexts

15.1

Problem statement

The Sendai Framework definitively articulates the shift from managing disasters to managing risk. This provides a powerful impetus for the “traditional” DRR community, seeking to redress practice that has for many years seen ex ante action articulating the complex risk drivers from which disasters materialize eclipsed by action responding to the manifestation of disasters. Translating this shift into informed, systems-based decision-making, investment and practice in all contexts and at all scales, and reflecting this in local to national strategies, is arguably the principal preoccupation of this community.

Growing understanding of the complex risk environments in which disasters occur has raised questions for DRR policymakers and practitioners who frequently operate in complex contexts, be this in relation to complex health crises,⁴²⁵ or natural hazard-related disasters in contexts of environmental or economic stress, or armed conflict,⁴²⁶ for example; or a combination of several or all of these. Contexts in which humanitarian response⁴²⁷ and DRR⁴²⁸ are implemented are therefore more complicated and challenging than is often acknowledged or represented in policy and programmatic documents. This leads

⁴²⁵ (Lo et al. 2017)

⁴²⁶ (Peters and Peters 2018)

⁴²⁷ (Hilhorst et al. 2019)

⁴²⁸ (Harris, Keen, and Mitchell 2013); (Peters 2018)

to questioning how to effectively design DRR strategies that adequately reflect and address the complexity of the context in which disaster risk manifests, and the diversity of disasters themselves.

The expanded remit of the Sendai Framework allows the DRR community to think beyond natural hazards and to engage with complex, systemic risk. This needs to be operationalized in combination with the other post-2015 frameworks, which include mechanisms, practitioners and tools better suited to dealing with other threats, hazards and shocks. In addition to those dealing with sustainable development, climate change, good urbanization and financing development, the New York Declaration for Refugees and Migrants represents an issue that is also closely related to disaster risk in fragile contexts; all of these operate alongside threat-specific frameworks at the national level. Calls for greater emphasis on coherence in implementation across the global frameworks feature prominently in discussions on resilience.⁴²⁹ And notable assessments seeking to better understand the complexity of risk have emerged, including for example OECD resilient systems analysis.⁴³⁰

15.2

Empirical examples of disaster risk reduction in fragile contexts

Multiple interacting risks within a system, or complex risk, are present within all contexts, and the manifestation of this complexity is unique to

each specific context. At different times within a given context, different combinations of risks may become more or less salient. For example, particular vulnerabilities in WASH systems may be expressed when health systems in a politically unstable country falter during a rainy season. Even within a given context, there are many ways that DRR can respond to the complex interplay among risks, which also points to the necessity of adaptive management. While complex systems are challenging to address, much less understood, the application of a nuanced understanding of systemic risk to local to national DRR strategies provides for expanded opportunities to achieve the goals set forth in the Sendai Framework.

The following diverse set of examples from Bangladesh, Iraq, Somalia and South Sudan show how disaster risks materialize and are managed in the context of new and emerging hazards and threats that comprise complex risk environments. While no context is simple, the examples are set in particularly complex situations, illustrating how DRR has been adapted to engage more fully with environmental, climatic, economic, social and political challenges, including conflict, environmental fragility and climate change, political upheaval, human displacement, economic shocks and health crises. The examples are not exhaustive, neither do they reflect traditional representations of DRR strategies, but they do touch on aspects of DRR policies, strategies, frameworks and interventions that have been drawn from direct experiences of the DRR community. They illustrate how disaster risk has been constructed – and reduced.

A theme that runs through all the cases is the challenge of conflict. Upsurges in violent conflict have been shown to slow, undermine or stall DRR strategies and their implementation. With little in the way of practical policy guidance on how to navigate changing conflict contexts, many countries

find the legislative approval of DRR laws halted – as was the case for Fiji and Nepal.⁴³¹ In other contexts, increased insecurity can lead to DRR programmes being temporarily suspended. This has been the case in the Central African Republic (CAR). The violent conflict and political crisis that began in 2013 has provoked humanitarian impacts that have led to large-scale human displacement, degradation of the education system, negative impacts on sanitation and access to water, and food insecurity.

Due to the security situation in CAR, the implementation of development projects and programmes has been temporarily suspended. Development partners have focused their attention and financing on the emergency situation at hand. These factors have delayed the creation of strategies and policies for DRR, but in spite of these challenges, the CAR government has established a reflection committee focused on DRR whose primary mission is to coordinate activities and create a plan for a national strategy. The first draft of NSDRR has taken the current political crisis into account.

Additionally, armed conflict features among the types of risks and disasters mentioned in the strategy. Finalizing, validating and implementing the national strategy depends on financing, which is sorely needed.⁴³² As evidenced in CAR, despite the difficult operating environment, advances in DRR in policy and practice, are feasible – as the cases below demonstrate.

15.2.1

Human displacement in the context of recurrent disasters and conflict

In Somalia, the forced movement of people, most of which results in internal displacement rather than cross-border flight, can be a cause and a consequence of disaster and conflict. The regular occurrence of drought- and flood-related disasters, and outbreaks of conflict regularly drive people to flee their homes, sometimes more than once, and Somalia consistently has very high levels of annual new displacement movements.

Case study: Somalia

Somalia is a highly disaster-prone country. It is susceptible to drought, riverine and flash flooding, and with its long coastline, storms and cyclones coming in from the Gulf of Aden and the Indian Ocean. It has also been affected by decades of conflict and political instability and insecurity.⁴³³ This includes attacks by armed groups, such as al Shabaab, and clan violence that can erupt over scarce natural resources such as water points and grazing areas. Unique and highly impactful combinations of disaster and conflict have materialized in Somalia, shifting from year to year. These dynamic situations of complex risk have induced large-scale human displacement, which has added to the complexity of the country's disaster risk and vulnerability.

As of July 2018, there were an estimated 2.6 million IDPs in Somalia against a backdrop of multifaceted conflicts and intensified competition for resources due to climate-related disaster events. According to the UNHCR Protection and Return Monitoring Network, some 642,000 new internal displacements were recorded between January and July 2018, with flooding the primary reason for displacement in 43% of cases, followed by drought in 29% of cases and conflict in 26% of cases. However, it should be noted that while there is usually a primary reason, displacement occurs often as the result of a combination of risk drivers, including economic pressures. These mounting pressures ultimately trigger people to leave their homes. Displaced people living in poorly resourced displacement camps or informal settlements are more likely to be displaced again by disasters.

⁴²⁹ (Peters et al. 2016)

⁴³⁰ (OECD 2014a)

⁴³¹ (Wilkinson et al. 2017)

⁴³² (Adapted from input from UNDP)

⁴³³ (Case study adapted from input from GFDRR, IDMC and UNHCR)

Somalia has endured several severe drought episodes in recent decades. In 2011, the worst drought in 60 years resulted in 260,000 deaths and affected 13 million people in the Horn of Africa. The drought combined with the political situation resulted in large-scale famine, and led to large-scale displacement, disruption of basic services and impoverishment. In early 2017, conditions in Somalia manifested as a major drought with high famine risk; half the population was made acutely food insecure. Almost 1.3 million new displacements were recorded in 2017 due to conflict and disasters, with 84% of IDPs citing drought-related reasons for their displacement. Thanks to a massive scale-up in humanitarian assistance, famine was averted, but it remains a looming risk in the future.

Humanitarian efforts have not been simple or straightforward. Large parts of the drought-affected rural areas in southern and central Somalia were controlled by al Shabaab and were inaccessible to the government and most humanitarian organizations and international actors. To assess drought impacts under these circumstances and guarantee the personal security of staff, humanitarian actors relied on remote assessment methods that combined remote-sensing technologies and social media analytics. This was combined with information received from partner networks and limited household surveys conducted by a field presence in Somalia to determine the extent of drought impacts and humanitarian needs.

In addition to drought, Somalia is also highly affected by floods. Combined with conflict and insecurity, these have led to continued population displacement internally and across borders. In early 2018, widespread flash flooding in the Horn of Africa destroyed extensive areas of farmland, damaged health facilities, disrupted schools and destroyed more than 15,643 houses in Somalia. Among the areas

suffering the impacts of flooding were overcrowded IDP settlements. Many of the thousands of people displaced in the Shabelle river basin in the south of Somalia were people who had previously been displaced by drought and were living in makeshift shelters unable to withstand heavy rain. Flooding in these settlements further displaced people along riverine areas. The detrimental impacts of the flash floods on the Somali population also included rising cases of acute watery diarrhoea, cholera, contaminated drinking water and higher food prices. Tropical Cyclone Sagar, which struck the north of the country in May 2018, further intensified the already burgeoning humanitarian needs of the affected population.

Repeated disaster- and conflict-induced displacement in Somalia have led to an increase in urbanization, as large numbers of people relocate to urban centres to access humanitarian aid and other assistance. Demographic shifts contribute new layers of risk by adding additional stress to already strained key sectors such as land, housing, health, education, water supply, sanitation and livelihood. Further, in Mogadishu, displaced persons arriving in the city tend to live in informal settlements where they are susceptible to forced evictions, and subsequently face displacement anew. They are often displaced to still worse locations, creating a positive feedback loop of displacement and suffering. In response, drought assessment and recovery frameworks are increasingly including the urban sector as a priority area; according to some assessments, the urban sector accounted for the second-highest recovery needs after agriculture.⁴³⁴

Attempts have been made to model disaster displacement risk in the Horn of Africa. These show that socially created situations of vulnerability, along with the concentration of people in areas exposed to hazards, have a large impact on displacement risk. In fragile and

conflict-affected settings, special attention has been paid to create interventions aligning short-term, urgent, life-saving assistance and protection of the most vulnerable with longer-term sustainable solutions for Somalia to strengthen its resilience and address the root causes of underlying vulnerabilities. A comprehensive drought impact needs assessment (DINA) improved the understanding of the dynamics and drivers of recurrent emergencies, and a Recovery and Resilience Framework proposes long-term durable solutions for building the resilience of the drought-affected population.⁴³⁵

Somalia has recently taken steps to formalize DRR measures and is currently working on a NAP. It is also part of the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI), for the period of 2013 to 2027, and has its own national plan within this process. IDDRSI explores the interlinkages between disasters and conflict, in the context of drought and the impacts on traditional livelihoods. It also discusses forced displacement as a cause and consequence of this, across borders and within countries.

Somalia also relies on pre-existing networks and expertise already established in the country to formulate its DRR strategies. Technical experts (e.g. agronomists, meteorologists, veterinarians and water engineers), funded by international organizations, have worked on issues related to drought and its effects on pastoralism and agriculture for many years. They have been using the knowledge of and working with communities and local governments, sometimes informally, for decades.⁴³⁶ There are also multiple examples of cooperation between humanitarian and development organizations to: distribute food and non-food items and cash; treat malnutrition among children and pregnant or lactating women; increase the availability of improved water by repairing and rehabilitating water points; promote good hygiene practices; provide water treatment materials; and distribute livelihood inputs for agriculture, animal husbandry and riverine fishing. In addition, vulnerable communities are being supported to develop community-level drought preparedness and response plans.

Despite a complex situation of natural hazard risks and conflict-related displacement, Somalia continues to work towards formal risk reduction planning and climate change adaptation measures as essential tools to build and sustain socio-economic development. In doing so, it also leverages networks of long-term humanitarian and development partners in the country, to build capacity, provide technical support and humanitarian assistance when needed.

⁴³⁴ (Adapted from input from GFDRR)

⁴³⁵ (UNISDR and Internal Displacement Monitoring Centre 2017)

⁴³⁶ (FEWS NET 2018)



Rohingya Camps in Cox's Bazar
(Source: Mohammad Tauheed, Flickr)

Since August 2017, violence against Rohingya communities in Rakhine State, Myanmar, has resulted in 727,000 people⁴³⁷ – mostly women and children – fleeing their homes across the border to Cox's Bazar District, Bangladesh.⁴³⁸ This exodus brings the total number of displaced Rohingya

population to about 919,000, vastly outnumbering the people living in the host communities. The displaced Rohingya population account for about one third of the total population in Cox's Bazar, an area that was already densely populated and facing severe development challenges.⁴³⁹

Case study: Cox's Bazar, Bangladesh

The displaced Rohingya people in Cox's Bazar, Bangladesh, are sheltered in makeshift settlements in extremely congested areas, including in the Kutupalong "mega-camp", which quickly became the largest refugee camp in the world. The camps have minimal access to basic infrastructure and services, and are prone to natural hazards, especially cyclones, floods and landslides. Setting up the camps has led to rapid deforestation, further increasing the vulnerability of the displaced Rohingya to the effects of monsoon rains. Relocation of households most

at risk from landslides and flooding is under way, but there is insufficient suitable land available to accommodate even the highest-risk category of people.

An assessment of medium-term needs and a risk assessment identified priority investments to improve DRM and public service delivery to the displaced Rohingya population and host communities. These investments address health, education and emergency response. The Health Sector Support Project helped to further develop disease surveillance and outbreak response capacities of the

Ministry of Health and Family Welfare. Activities to strengthen disease outbreak response include vaccination campaigns and disease-specific diagnosis and treatment services, as well as mechanisms for responding to the health impacts of possible disasters, such as the spread of cholera and diarrhoea as well as other water- and vector-borne diseases and an increased risk of drowning and injuries associated with storms and flooding.

Activities for the ongoing Reaching Out-of-School Children Project are specifically designed to ensure safe and equitable learning opportunities for all 300,000 crisis-affected children and youth in the region, including refugees and host communities. Interventions include the renovation of primary schools, procurement of learning materials, awareness-raising regarding GBV and promotion of psychosocial well-being activities to overcome the shock of violence and forced resettlement. In view of the high risk of disaster, the renovation work will include physical measures to ensure safe learning environments for children.

The Emergency Multi-Sector Rohingya Crisis Response Project aims to strengthen the capacity of the Government of Bangladesh to respond to the Rohingya crisis by improving access to basic services and building disaster and social resilience of the displaced Rohingya population. Project interventions include: improving access to clean water supply and sanitation; improving access to multipurpose disaster shelters, evacuation routes and disaster response

capacity; improving public service infrastructure; strengthening GBV support services; implementing a community services and work programme to engage displaced Rohingya population in the delivery of small works and services in the camps; and institutional strengthening activities for government institutions responsible for managing the crisis.

In parallel, host communities in the Cox's Bazar District are being supported through existing projects addressing: multipurpose disaster shelters that support disaster preparedness; improving municipal governance and basic urban services in participating urban local bodies; supporting fiscal transfer systems; improving collaborative forest management; and increasing benefits for forest-dependent communities.⁴⁴⁰

Project-based initiatives in Cox's Bazar, while providing valuable support to affected communities, may be limited in their ability to secure longer-term risk reduction outcomes for affected communities, the host community of Cox's Bazaar and the newly arrived Rohingya. The political sensitivities associated with issues such as permanent resettlement, citizenship and rights, from the perspective of the host States (Bangladesh and Myanmar), mean that international agencies have significant challenges in supporting DRR responses. Supporting responses that assure the dignity of affected populations, capitalizing on the resources and capacities of the refugees themselves are still more challenging.⁴⁴¹

The Bangladesh Cox's Bazar case study illustrates that there is not an easy solution to the broader risks facing residents of Cox's Bazar. Continued governmental engagement and capacity will be essential to longer-term risk reduction. Incremental gains can be made at the community level by supporting the host community and the newly arrived, and addressing the needs of the whole

community through education and social welfare initiatives.

⁴³⁷ (ISCG 2018)

⁴³⁸ (International Organization for Migration 2018)

⁴³⁹ (Adapted from input from GFDRR)

⁴⁴⁰ (Adapted from input from GFDRR)

⁴⁴¹ (Wake and Bryant 2018)

15.2.2

Reducing disaster risk with an arid and changing climate and the impacts of conflict

South Sudan is exposed to natural hazards such as drought, which often become disasters.⁴⁴² Changes

in weather patterns and climatic shocks are particularly impactful in contexts like South Sudan where livelihoods are largely based on animal husbandry, agriculture, fishing and trade.⁴⁴³ South Sudan is also heavily affected by war and violence. South Sudan became independent from Sudan in 2011 after a 22-year civil war.

Case study: South Sudan

After only two years of peace, South Sudan's post-conflict transition has been mired in political instability, power struggles and a new civil war since 2013. The combination of natural hazards and war has had dire consequences for the South Sudanese people. After experiencing years of drought and war, in April 2017, the United Nations declared that South Sudan was suffering from famine, which affected at least 100,000 people.⁴⁴⁴

Despite the protracted nature of conflict in South Sudan, State and non-State actors recognize the need to build longer-term resilience while balancing the need to address more immediate humanitarian demands. South Sudan launched its National Adaptation Programme of Action in 2017, outlining its most urgent climate adaptation needs. With this in place, State and non-State actors are now beginning discussions about a road map to develop South Sudan's NAPs to address longer-term CCA priorities. The national DRM

policy, in its final stages, recognizes the need to reduce disaster risks and adapt to a changing climate. In parallel to these policy processes, civil society is working with local communities to integrate CCA, DRR and ecosystem management approaches.⁴⁴⁵

This includes community-led wetland management practices to preserve necessary ecosystem services to mitigate the impacts of floods and drought. Similarly, a VCA tool is applied, which is typically used in non-conflict settings, to identify appropriate strategies to understand prevailing risks and inform the design of appropriate risk reduction measures.⁴⁴⁶ In addition, a report about the state of the environment was issued in mid-2018, which will guide the various government departments and non-State actors on sustainable management of the natural resources for DRR.⁴⁴⁷ Despite these efforts, more work is required to better understand how to support coherence and complementarity between climate and disaster resilience policy and programmes, including in ways that are conflict sensitive.

The situation in South Sudan shows the impact of compounded risks to the population of natural hazards and armed conflict. Nonetheless, the government response is to continue to build

longer-term resilience, beginning with the most urgent disaster hazards and climate change impacts, while also meeting immediate humanitarian needs.

⁴⁴² (Adapted from input from IFRC)

⁴⁴³ (Overseas Development Institute and Humanitarian Practice Network 2013)

⁴⁴⁴ (IFRC 2018a)

⁴⁴⁵ (Wetlands International 2019)

⁴⁴⁶ (IFRC 2018b)

⁴⁴⁷ (UNEP 2018)

⁴⁴⁸ (Adapted from input from UNDP)



Mosques, houses and streets that were ruined during the war in Mosul
(Source: Photographer RM / Shutterstock.com)

Extreme drought in Iraq has been brought about by environmental, development and political factors, with cascading consequences.⁴⁴⁸ Climate change has been intensifying drought and drying up water resources in the region, with the drought situation exacerbated by increased upstream water usage,

including new dams along the Euphrates and Tigris Rivers beyond Iraq's borders. The flow of river water into Iraq has dropped by about 50% in recent decades, and is expected to decline by another 50% as upstream water usage and drought from climate change increase.

Case study: Hawr al-Huweizah, Iraq

The problem of drought in Hawr al-Huweizah, Iraq, has emerged recently, after water supplies from the Islamic Republic of Iran ceased and water flows from the Mashrah and Kahla Rivers reduced. They are fed by the Tigris River, which is under water stress due to reduced in-flows and increased abstraction. The Ahwar marshlands of southern Iraq, which

were named as UNESCO World Heritage Sites in 2016 due to their cultural history and unique natural characteristics, are among the ecosystems affected.

Drought and intense water scarcity in the country have led to an increase in desertification, a decline in green areas and agricultural land, and an increase in livestock mortality. Agricultural production is expected

to decrease significantly as pastures and fields are degraded. The expected impacts on livelihoods have the potential to drive the rural Iraqi population to migrate to cities and urban communities as they seek alternative livelihood opportunities to generate household income. Adding to these challenges, the disruption of electrical power systems will have a direct impact on the availability of electricity for households as well as industrial usage and infrastructural activities, such as sanitation. Without functioning sanitation systems, the risk to the Euphrates and Tigris Rivers of contamination (from multiple types of waste) and decreasing water quality of already-scarce water resources, is high. Additionally, scientists and environmentalists have warned of the possible collapse of the Mosul Dam, the largest dam in Iraq, and assessments have indicated that the overwhelming flooding that would ensue would lead to a severe loss of life.

Iraq's security situation also plays into the complexity of risk factors facing the country, with armed attacks having destroyed cities throughout the country, leading to death and displacement of civilians from the northern regions to central and southern Iraq. This has affected the economic and social life of the population, including through destruction of civil and governmental buildings and the disruption of public services, especially those related to health and education. Reconstruction is hindered by chemical pollution from conflict, and around 7 million m³ of debris that must be transported and examined to ensure it is free of radiation or toxic chemical agents.⁴⁴⁹

Iraq has taken several measures specifically to address drought and desertification. These measures include CCA activities, such as the implementation of an integrated water resources management (IWRM) system, and the use of modern irrigation methods, such

as sprinkler irrigation and drip irrigation. The country has taken measures to enforce environmental legislation related to water usage and consumption and increased the monitoring of its water, air and land resources through monitoring and control stations, including seismic monitoring stations, meteorological stations and radiation measurement stations.

Iraq has also made progress on actions related to DRR more broadly. DRR has been integrated into national development plans, and nationally appropriate disaster mitigation actions are obtaining approval for implementation. The priorities of the National Strategy for Disaster Management are based on the priorities of the Sendai Framework, but they employ measures specific to the priorities of action in Iraq, that is the environment, the climate, and the economic, social, cultural and political situation.⁴⁵⁰

Iraq's National Disaster Risk Reduction Strategy describes the security context and includes actions to reduce security risk. In addressing systemic risk, the national strategy also includes a variety of programmes and plans to combat poverty and enhance societal resilience to reduce the risk of disasters and cascading impacts. Communities at particular and persistent risk of disasters include communities located near rivers, in close proximity to flood-prone dams, in low-lying areas prone to flooding during heavy rains, along seismically active zones and in areas affected by conflict. DRR activities include: awareness-raising; improvement and development of legislation and laws; formation of national committees and special forums on DRR; and regional and international cooperation in support of national and local plans and programmes.

Iraq faces a challenging set of risks, notably drought and water scarcity, that are compounded by the direct impacts of armed attacks and the contaminated residue and social dislocation that result. It has taken these as the foci for its national strategy and risk reduction measures, addressing IWRM and the security context, as well as the environmental, climatic, social, cultural and political context. Reflecting the specificities of context, Iraq thus aims to address systemic risk through a range of socioeconomic measures that extend beyond the traditional concepts of DRR.

15.3

Implications of complexity for addressing disaster risk

The above case studies illustrate the complex nature of the interaction of natural hazard risks and other environmental, social, political and economic conditions and variables. These "wicked problems" are challenging to understand, in part because it is difficult and even unproductive to determine where a disaster risk begins and ends in a complex world. Isolating one factor – disaster risk – in a complex interaction is artificial, because people experience natural hazards combined with other conditions and from the vantage point of their vulnerabilities and capabilities. The case studies also illustrate how different organizations focusing on DRR address complex risk in different ways; there is no single, correct approach to achieving DRR in complex risk contexts.

While complexity plays out in unique ways in each specific context, themes have emerged from the case studies above that are common to complex systems of risk. These themes include: the importance of addressing a wide range of vulnerabilities where risks combine; considering particularly vulnerable persons and groups and engaging them in the risk reduction process; engaging long term across sectors and at multiple levels; and adapting to a rapidly changing and dynamic context.

15.3.1

Addressing a wide range of vulnerabilities where risks combine

DRR policies, strategies and projects operating in complex systems of risk must address a wider range of vulnerabilities than traditionally considered in the purview of DRR, because these vulnerabilities interact to form disaster risks. For example, several of the case studies illustrated how disaster, conflict and human displacement interact to create systems of complex and cascading risk (also discussed in Chapter 2). In Somalia, sudden and slow-onset hazards and events compounded by protracted conflict have led to continued population displacement internally and across borders. The IDMC Disaster Displacement Risk model for the Horn of Africa affirmed that socially created situations of vulnerability along with the concentration of people in areas exposed to hazards have a large impact on displacement risk. In CAR, Iraq, and for the Rohingya population, the ongoing crises and repeated disasters have led to large-scale population displacement.

These population displacements, including people who are displaced more than once, present multiple challenges to DRR. Population shifts to already overcrowded IDP settlements, refugee camps and urban centres can overwhelm institutions and

⁴⁴⁹ (Adapted from the Government of Iraq contribution via the UNISDR Regional Office for Arab States)

⁴⁵⁰ (Adapted from the Government of Iraq contribution via the UNISDR Regional Office for Arab States)

services that are already extended to or beyond capacity, particularly in situations of political instability or crisis. Cascading effects of disasters, conflict and displacement can lead to the deterioration of education, sanitation, health, food and water systems, and services, potentially leading to health crises such as cholera or diarrhoea, and intensified competition and conflict over scarce resources. Such cascading impacts are symptomatic of the failure to address a sufficiently wide range of risks and vulnerabilities, and can deepen vulnerabilities and amplify or create new risk.

Several case studies indicate that a wider range of vulnerabilities must be addressed by DRR in these complex contexts. Examples include, programmes addressing underlying vulnerabilities associated with drought and famine in Somalia, or support to the Government of Bangladesh to build its capacity to respond to the Rohingya crisis through meeting immediate basic needs, as well as strengthening the social resilience of the displaced Rohingya population.⁴⁵¹

In Iraq, the National Disaster Risk Reduction Strategy addresses the persistent security threats facing the country, as well as risks stemming from floods, drought, and toxic and non-toxic remnants of the war, which create health risks and impede the extension of basic services. National and regional DRR policies across contexts must formally and explicitly recognize the interlinked risks of disasters, conflict and displacement with an eye to present and future conditions. Both current, and a range of likely future, conditions, should inform the design of immediate humanitarian and long-term development strategies.

In Afghanistan, another country facing complex risk, a multi-hazard risk assessment was completed in 2017. Afghanistan's NSDRR recognizes that decades of conflict have undermined coping mechanisms and protective capacity in the country. In addition to an assessment of risk from five different hazards (avalanche, earthquake, floods, drought and landslides), the vulnerability analysis section refers to years of conflicts

as a factor that determines the degradation status and higher vulnerability of infrastructure and public facilities.⁴⁵² In CAR, the first draft of NSDRR has taken the political crisis and its negative repercussions into account, explicitly featuring armed conflict as a type of risk and disaster.

15.3.2

Considering particularly vulnerable persons and groups

In discussions about vulnerability (see Chapter 3 of this report), it is clear that individuals and groups experience unique combinations of risk and are thus in need of specific considerations. Groups that tend to have more concentrated vulnerability and critical needs include women and girls, youth and children, elderly, lesbian, gay, bisexual, transgender and intergender communities, disabled and differently abled, and otherwise religiously, ethnically, socioeconomically, and geographically disempowered and marginalized groups. Providing assistance and support to the most vulnerable people and communities reduces the added vulnerability that can result from disaster impacts.⁴⁵³ In Afghanistan, socioeconomic inequalities are deepening, and this compounds disaster impacts and increases the vulnerability of particular groups. Afghanistan's NSDRR commits to promoting equitable economic growth as well as to principles of social inclusion and environmental conservation as a way to address disaster risk for particularly vulnerable groups, in addition to targeted capacity-building activities.⁴⁵⁴

These needs are magnified in places affected by conflict, political instability and violence, where vulnerable groups also include large numbers of victims of violence and those at heightened risk of violence. Disaster and conflict often lead to a higher rate of GBV, putting women, girls and lesbian, gay, bisexual, transgender and intergender communities at heightened risk in these contexts.⁴⁵⁵ There are several examples of projects focused on addressing violence-related vulnerabilities. In Bangladesh, a dedicated project has

been designed to ensure safe and equitable learning opportunities for all 300,000 crisis-affected children and youth in the region, including refugees and host communities. Programming includes awareness-raising regarding GBV and promoting psychosocial activities to overcome the shock of

violence and forced resettlement. In Somalia, GBV is addressed by combining economic empowerment interventions for women with integrated clinical, psychological and legal services for GBV survivors at the community level, as well as institutional strengthening and capacity-building.⁴⁵⁶



People who carry water rest under a tree in the refugee camp in Baidoa, Somalia
(Source: Mustafa Olgun/shutterstock.com)

Several of the case studies highlight the acute vulnerability of IDPs, refugees and host communities to disaster risks. In Bangladesh for example, the displaced Rohingya people are sheltered in makeshift settlements with minimal access to

basic infrastructure and services, which makes them particularly vulnerable to natural hazards such as cyclones, floods and landslides. The quick establishment of makeshift shelters has caused deforestation, further increasing vulnerability to

⁴⁵¹ (Adapted from input from GFDRR)

⁴⁵² (Afghanistan, State Ministry of Disaster Management and Humanitarian Affairs and Afghanistan National Disaster Management Authority 2018)

⁴⁵³ (IFRC 2015); (Gaillard et al. 2017); (Gaillard, Gorman-Murray and Fordham 2017)

⁴⁵⁴ (Afghanistan, State Ministry of Disaster Management and Humanitarian Affairs and Afghanistan National Disaster Management Authority 2018)

⁴⁵⁵ (IFRC 2015); (Gaillard et al. 2017); (Gaillard, Gorman-Murray and Fordham 2017)

⁴⁵⁶ (GFDRR 2019)

the effects of monsoon rains; as evidence by flash flooding and landslides in 2018. Rains “caused over 130 landslides, damaged 3,300 shelters and affected 28,000 refugees” near Cox’s Bazar, with women the most at risk of disaster impacts.⁴⁵⁷ The emergency relocation of refugees affected by the flooding has been challenged by a lack of suitable available land. In other contexts of cross-border displacement, it was highlighted that newly arrived refugees in some contexts may be less adapted to their host country’s climate, and they may face increased vulnerability to weather extremes during their adjustment period.⁴⁵⁸

Where livelihoods are heavily dependent on stable ecosystems, DRR processes should include concerned communities in the analysis of vulnerability and development of appropriate responses. In South Sudan, international actors are working with local communities to integrate CCA, DRR and ecosystem management approaches to preserve necessary ecosystem services and mitigate the impacts of floods and drought.⁴⁵⁹ In Bangladesh, a sustainable forests and livelihood project for host communities is improving collaborative forest management and increases benefits for forest-dependent communities. In Somalia, vulnerable communities are being supported to develop community-level drought preparedness and response plans.⁴⁶⁰

15.3.3

Engaging long term across sectors and at multiple scales

Resolving systemic risk is not achieved quickly. It requires long-term engagement across sectors and at multiple levels. The probability that recurrent emergencies will persist is high, even with well-planned and executed strategies. However, over time and with dedicated attention and often incremental action, complex disaster risks can be managed and reduced. Aligning DRR efforts with other international platforms, international and local humanitarian and development partners, the private sector, national and local governments,

and local communities and governance structures provide opportunities to coordinate across sectors and at multiple levels of governance. Coordinated, collaborative action allows for organizations to play to their strengths and not extend beyond their own institutional capacity while also creating synergies and positive exchanges among actors. Harmonized efforts also lessen the possibility that different groups inadvertently duplicate efforts or fall short of meeting even immediate life-sustaining needs. Complexity demands that all actors must act together as partners on the front-line systemic risk reduction.

In the case of Bangladesh, a Joint Response Plan was prepared between the Government of Bangladesh and development partners, and in Somalia, a DINA complemented rather than duplicated the Humanitarian Response Plan already in place. In Afghanistan, the National Afghanistan Strategy for Disaster Risk Reduction calls for DRR to be mainstreamed into development planning, sectoral plans, capacity-building, CCA, livelihood security, gender mainstreaming, community empowerment, and response and recovery management. It aims to improve coherence and integration in efforts to reduce the risks posed by disasters, climate change, conflict and fragility, with other development imperatives, and places this at the centre of the pursuit of the achievement of the outcome and goals of the post-2015 international agreements and frameworks, including the SDGs.

The coordination among humanitarian and development actors in Somalia has resulted in data sharing, integrating lessons learned on improving efficiency, and ensuring that funds are not diverted from emergency needs.⁴⁶¹ Likewise, new policies are particularly successful when they build upon pre-existing networks and expertise that are already established in the country, including international and local humanitarian organizations, technical experts and local governments. This coordination can be carried out in formal and informal capacities. In Afghanistan, *shuras*, or traditional informal community-based approaches to hearings and judgments, serve multiple purposes, such as providing assistance during disasters

as well as local-level conflict resolution mechanisms.⁴⁶² Conversely in the case of Iraq, more formal structures of cooperation, including established international coordination mechanisms and partnerships, are more likely to facilitate solutions to meeting the country’s needs for funding, technological capabilities and capacity-building.

15.3.4

Adapting to a rapidly changing and dynamic context

Situations of complex risk are inherently dynamic, and can change rapidly in unanticipated or unpredictable ways. Because risk within this perspective is understood as polycentric, no one risk takes priority over the others. The removal of a specific risk may not fundamentally alter the system, and the manifestation of one risk has the potential to trigger other risks within the system. The speed of change, uncertainty surrounding that change and the multitude of possible changes in a complex context have particular implications on long-term engagement and the need to deliver on commitments and goals. In contexts affected by political instability and social unrest, security may suddenly and dramatically change the operational context, altering the ability to effectively design, plan, and implement strategies and programmes.

In Somalia, the environmental and security context rapidly evolved throughout implementation phases, necessitating flexible and adaptable programming.⁴⁶³ Ongoing attacks by armed groups and clan violence combined with drought- and flood-related disasters has necessitated shifts in programming. Becoming more adaptable through budgetary measures, such as merging the budget into a single-line item, allows for programmatic shifts

between categories when certain activities were prohibited by a sudden change in the security situation. Likewise, monitoring systems need to be based on target ranges rather than fixed targets to remain adaptable to rapidly changing environments. Technology can be used in particularly insecure and dangerous operating contexts, for example in large parts of the drought-affected rural areas in southern Somalia which are controlled by al-Shabab militia and inaccessible for government counterparts and most humanitarian organizations.⁴⁶⁴ As presented in the case study in section 15.2, the use of remote assessment methods that combine remote-sensing technologies and social media analytics has been extremely useful. This information can then be combined with information received from partner networks and limited household surveys conducted by a vendor with field presence in Somalia.

Environmental conditions also have the capacity to deteriorate rapidly or to oscillate among extremes, particularly when combined with environmental degradation and climate change impacts. For example, Somalia is vulnerable to flash floods and drought, both of which are connected to a suite of associated risks. In Bangladesh, the sudden and large-scale nature of the Rohingya refugee crisis led to deforestation and increased risk of flash flooding and landslides. The impacts of climate change, which increase the risk factors for extreme and unpredictable weather patterns and events, also contribute to environmental fragility. For example, in 2018 the Climate Centre (Red Cross Red Crescent) noted that Turkey is currently hosting approximately 3,400,000 Syrian refugees while at the same time experiencing its hottest summer in 47 years. Widespread heatwaves stretch humanitarian and health systems and point to the necessity of preparing institutions to reach the most vulnerable.

⁴⁵⁷ (OXFAM 2018)

⁴⁵⁸ (IFRC and UNDP 2014b)

⁴⁵⁹ (Wetlands International 2014)

⁴⁶⁰ (GFDRR 2019)

⁴⁶¹ (GFDRR 2019)

⁴⁶² (Afghanistan, State Ministry of Disaster Management and Humanitarian Affairs and Afghanistan National Disaster Management Authority 2018)

⁴⁶³ (Adapted from input from GFDRR)

⁴⁶⁴ (Adapted from input from GFDRR)

Infrastructural conditions may also cause a rapid change in complex risk. In Iraq, the Mosul Dam is located in the city of Mosul, which is highly affected by conflict and at risk of collapsing. The tenuous security situation makes DRR activities more challenging. If the dam were to fail, the security challenges would have the potential to affect disaster response and recovery.

15.4

Conclusions

Disaster risks emanate from development pathways, manifesting from the trade-offs inherent in development processes. In some ways, this has always been well recognized. What is new in today's increasingly interconnected society is the diversity and complexity of threats and hazards, and the complex interaction among them, which result in "an unprecedented global creation of risks, often due to previous socioeconomic development trends interacting with existing and new development dynamics and emerging global threats."⁴⁶⁵ There are distinct characteristics that need to be addressed and understood – aspects of interconnectivity, transboundary, transitional, transformational elements and simultaneity – in addition to facets of intensity, duration, frequency and rate.⁴⁶⁶ But there are also opportunities that arise, as risks are merely a description of possible outcomes.⁴⁶⁷ The exploration of the multidimensional nature of risk is improving and garnering greater attention in efforts to understand and manage risk. Answering and addressing these challenges calls for a more systemic approach to acknowledging the complex threats, risks and opportunities facing and resulting from development.⁴⁶⁸

The expanded scope of the Sendai Framework is a starting point, and must be reflected in the breath of national and local DRR strategies. So should the risk-informed development approach called for

in the Sendai Framework, through the systematic integration of risk information across all sectoral planning processes. Delivering DRR is possible in any context, but the scope of what is viable and appropriate will change depending on the context. And for some, such as those affected by armed conflict and fragility, what this looks like is still to be learned.⁴⁶⁹ There remains a dearth of practical and policy advice on how to devise and implement DRR strategies for complex risk contexts, including where violent conflict forms part of the broader environment in which DRR takes place. As such, this is an area that warrants further attention to attain Target E of the Sendai Framework.

Taking a broader and more nuanced approach to understanding how threats, hazards and shocks interact reflects the growing move towards utilizing systems thinking, grappling with complex risk and engaging with uncertainty. In many respects, the DRR community is leading the way, as illustrated by the initiation of GRAF, for example. This will require adopting "good practice principles in risk-informed development" such as inclusive and transparent, phased and iterative, flexible and adaptive, continuous learning and reflection approaches.⁴⁷⁰ Making development choices that support development trajectories that harness benefits for reduced complex risk, avoid risk creation and better manage residual risk, must be the way forward.

Part III Conclusions and recommendations

Conclusions

As Chapter 10 has illustrated, regional cooperation is key to knowledge-sharing and capacity-building among countries with similar risk profiles

and regional concerns, as well as to providing mechanisms for managing development funding and providing risk financing for their member countries. Regional platforms for DRR and other innovative regional multi-stakeholder partnerships play an important role in DRR awareness and cooperation. Intergovernmental organizations in most hazard-prone regions have developed cooperation on DRM, but a more active promotion of regional and national risk reduction is a role they could take on more strongly, for example by focusing on: (a) regional risk assessment and reduction, (b) the needs of SIDS, small countries and least developed countries for practical support in building capacity and risk information systems, and (c) risk financing mechanisms.

The enabling environment at national level is essential to performing integrated risk governance at national, subnational and community levels; addressing aspects of the authority of local governments to plan for, and carry out, essential DRR actions. This requires a review of the enabling legislation and the institutional frameworks, which often encourage working in silos rather than cross-sectorally and vertically from local to national levels. The enabling frameworks at national level are also the principal mechanism to ensure that the needs of vulnerable groups and the principles of equality and participation are integrated, especially for women and youth.

At national level, most countries identified in the research do not have coordination mechanisms among DRR, CCA and development planning. Some examples have been given of Pacific countries where the institutional structures are being built across these areas, and reinforced at the regional level with the 2016 FRDP.

On the issue of creating DRR strategies and plans according to the principles of the Sendai

Framework, there are many different approaches at national level, ranging from stand-alone plans and strategies to full mainstreaming into development plans (Chapter 11). Target E of the Sendai Framework does not necessarily require additional separate plans, but it does require countries to review existing DRR strategies in light of the Sendai Framework and ensure that local strategies dovetail with national level. Target E, to be met by 2020, is a small indication of what is required to accomplish the goal and outcome of the Sendai Framework. It is a stepping stone towards achieving this by 2030.

Integration of DRR into development planning strategies and frameworks at national level remains a challenge for many States (Chapter 12). Again, there are good examples of countries implementing this at national level, but so far, there has been insufficient time and information to determine whether these measures are affecting the outcomes of development planning, in particular to prevent the creation of new risk.

Integration of DRR into CCA policies and plans at national level is a new endeavour for most countries. The evidence gained from country practices is that it has not been undertaken by many countries so far (Chapter 13). Given the very threat to humanity posed by climate change, it is imperative that a more integrated approach is adopted to adapt to and mitigate climate change, together with broader development efforts preventing the creation of new risk and reducing existing risk. It must also be recognized that there are particular challenges for countries where effort to reduce other disaster risks, for example geophysical risk, are considered of greater priority. As called for in the Sendai Framework, all countries must assure adequate attention to the reduction of natural and man-made hazards and related technological, biological and environmental hazards and risks.

⁴⁶⁵ (United Nations Economic and Social Commission for Western Asia 2017)

⁴⁶⁶ (Opitz–Stapleton et al. 2019)

⁴⁶⁷ (World Bank 2013)

⁴⁶⁸ (Opitz–Stapleton et al. 2019)

⁴⁶⁹ (Harris, Keen and Mitchell 2013); (Peters 2018)

⁴⁷⁰ (Opitz–Stapleton et al. 2019)

A major challenge in integrating DRR with CCA and development planning is that faced by national and local governments in managing systemic risk in urban areas (Chapter 14). The dynamic, multi-dimensional nature of interrelating risks in urban areas require systemic approaches, that seek to understand the nature of interacting systems and adopt integrated risk governance adapted to the local context.

Fragile and complex contexts, especially where there is significant internal and cross-border migration due to war, famine and social disruption, present a particular set of challenges for local and national risk reduction and for integrated risk governance (Chapter 15). The risk context and landscape are constantly changing, demanding flexibility and agility from national and local level processes so as to be able to accommodate new and emerging risks.

Recommendations

The key recommendations arising from Part III are that integrated risk governance, or policy coherence, is the key to effective risk reduction at national and local levels, with the following issues highlighted:

- It is urgent that all **Member States give attention to establishing and aligning national and local DRR strategies with the Sendai Framework**, not only because 2020 is fast approaching, but because these provide the foundation and enabling environment for so much of what is required to achieve the outcome, goal and targets of the Sendai Framework and the 2030 Agenda.
- Developments in climate science that were not available at the time of the development and adoption of the Sendai Framework in 2015, call for far **greater urgency and ambition in our actions** than was previously understood. This reinforces the need to treat risk as a systemic issue, taking into account short- and long-term time frames. Based on the findings of the

2018 IPCC SR1.5, make clear the need for **DRR strategies to integrate CCA and mitigation centrally within risk reduction at national and local levels**.

- **Coherent and integrated national and local plans** are also the means by which Member States can best meet combined commitments made under the 2030 Agenda, the Paris Agreement, AAAAA, NUA, and other agreements of a thematic, sectoral or regional nature. The multidimensional nature of these commitments, and more importantly the underlying risks they address, require systems-based approaches, including in assessing needs and making national and local decisions about the most effective use of available resources.
- It is recommended that governments and national stakeholders, with strong engagement of the private sector and civil society down to community level, **review national and local enabling frameworks for equitable and sustainable development, climate change and risk reduction**. The objective is to identify the enablers and opportunities, as well as the barriers to integrated risk governance, which may come in the form of legislative mandates, institutional structures, capacity, resources, social equality/vulnerability, gender roles, people's awareness and habits of thinking about risk. This could also be described as an **integrated risk governance assessment**, taking into account multiple hazards (man-made, natural and mixed) and related risks, the way hazards, vulnerability and economic activity interacts with the environment and with each other within and among complex systems, and the need to adapt policy and implementation to **enable systems-based approaches to risk reduction**.