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:

---

370 (United Nations 2015a)

371 (Gencer and UNISDR 2017)

the enhancement by 2030 of 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)**
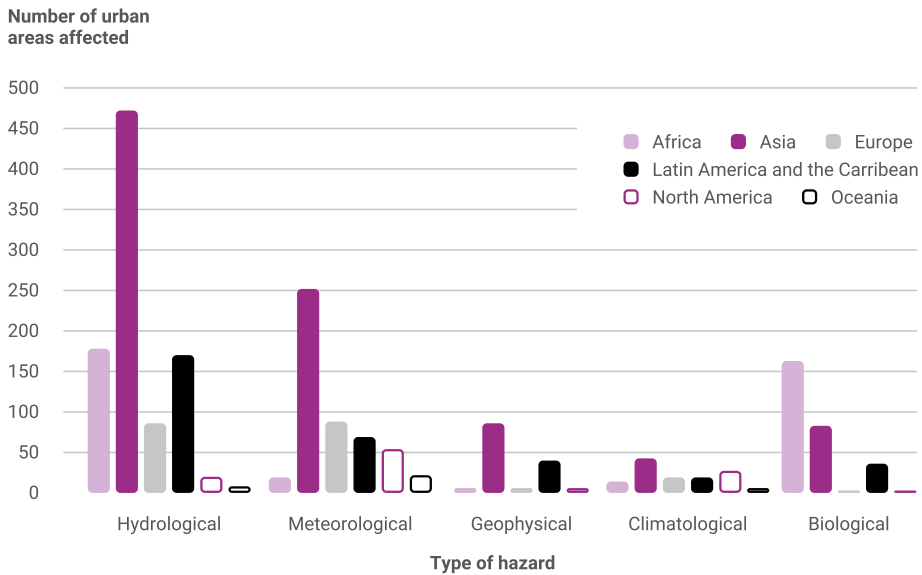
(Source: Gencer and UNDDR 2017)

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 still critical that national and subnational governments put in place

---

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)

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, UNDDR 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,* 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]

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

Governance And Financial Capacity
1. Organize for disaster resilience
2. Identify, understand and use current and future risk scenarios
3. Strengthen financial capability for resilience

Planning And Disaster Preparation
4. Pursue resilient urban development and design
5. Safeguard natural buffers to enhance the protective functions offered by natural capital
6. Strengthen institutional capacity for resilience
7. Understand and strengthen societal capacity for resilience
8. Increase infrastructure resilience

Disaster Response And Post-event Recovery
9. Ensure effective disaster response
10. Expedite recovery and build back better

CITY PLAN / RESILIENCE STRATEGY / ACTION PLAN

(Source: UNDDR 2017)

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)
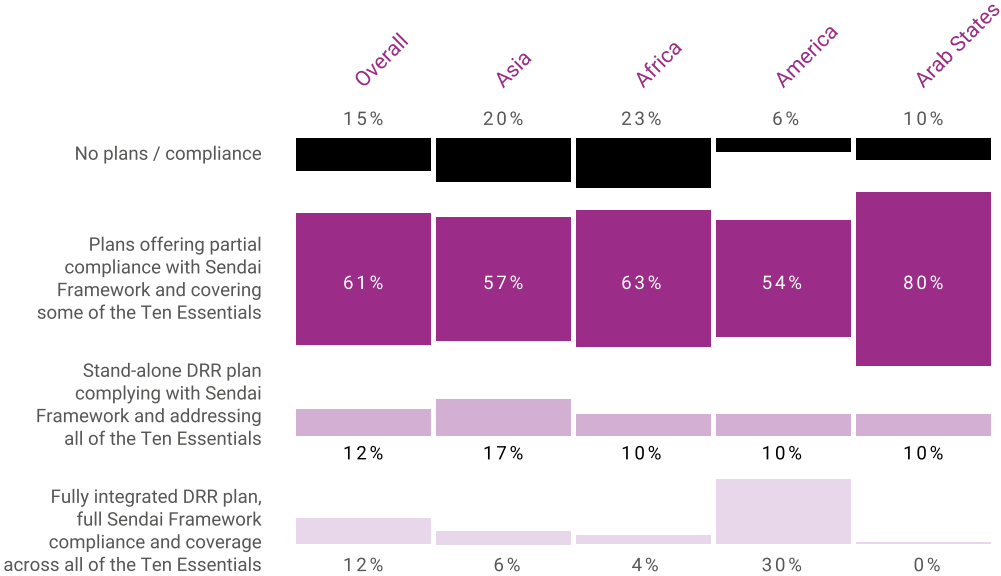**386** (Elkhidir, Wilkinson and Mannakkara 2019)
387 (UNISDR 2018b)

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

	Overall	Asia	Africa	America	Arab States
No plans / compliance	15%	20%	23%	6%	10%
Plans offering partial compliance with Sendai Framework and covering some of the Ten Essentials	61%	57%	63%	54%	80%
Stand-alone DRR plan complying with Sendai Framework and addressing all of the Ten Essentials	12%	17%	10%	10%	10%
Fully integrated DRR plan, full Sendai Framework compliance and coverage across all of the Ten Essentials	12%	6%	4%	30%	0%

(Source: UNDDR 2019)

---

388 (Amaratunga et al. 2019)

389 (Gencer and UNISDR 2017)

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
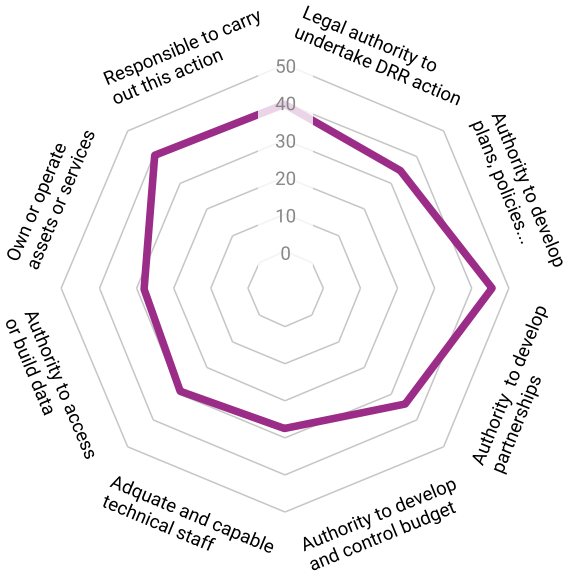
(Source: Gencer and UNDDR 2017)

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 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 UNDDR 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]

390 (Gencer and UNISDR 2017)
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)

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.

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

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

403 (Gencer and UNISDR 2017); (City of New York 2011); (City of New York 2018)
404 (Garschagen et al. 2018)

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]

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 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.

---

405 (UN DESA 2018a)
406 (Eltinay and Harvey 2019); (UNDP 2018d)
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)

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.

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

---

414 (UN-GGIM 2017)

415 (Sarmiento et al. 2019)

improve resilience by ensuring upgrading and retro-fitting of poorly planned and constructed settle-ments, ideally through a participatory process that will ensure implementation and sustainability.[416] Furthermore, the consideration of innovative plan-ning 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 condi-tions 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 resto-ration 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 commu-nity 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 impover-ished rural economies, or as a result of conflict and crises.[419]

An enabling factor for local DRR strategies in urban areas is developing an understanding of emerg-ing risks, aided by developments in systems and systemic risk modelling, which allow the develop-ment 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.

---

416 (Johnson et al. 2015)
417 (Bendimerad et al. 2015)
418 (Lenth 2016)

419 (Bendimerad et al. 2015)
420 (Hardoy, Winograd and Gencer 2019); (Hardoy, Gencer and Winograd 2018)

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.

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,

421 (Attolico and Smaldone 2019)
422 (Maurizi and Fontana 2019)
423 (UNISDR 2012)
424 (Anton et al. 2016)

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.

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.