Part III: Creating the National and Local Conditions to manage Risk

Our greatest responsibility is to be good ancestors
(Jonas Salk)[1]

Introduction

Chapters 1, 2 and Part I of this GAR described how the Sendai Framework calls on governments to move towards risk-informed governance arrangements that include a broader hazard and risk scope, and incorporate the concept of systemic risk. This requires integration across different sectors and levels of government, working with scientists, civil society and the private sector to address current and emerging risks. Part II then provided the first global reporting of Member States' progress against the Sendai Framework targets and indicators, and identified priority areas to increase the necessary data-collection capacity.

This part takes Target E as its starting point, that is, to substantially increase the number of countries with national and local DRR strategies by 2020, but it places it in the broader context of Member State efforts to achieve all the targets and ultimately the Sendai Framework outcome and goal through integrated risk management. Fulfilment of Target E is a stepping stone towards achieving the 2030 targets of reducing disaster losses, mortality, affected people, economic losses, damage to infrastructure and disruption to critical services. Hence, the decision by Member States to set delivery of this target by 2020. This part therefore takes a qualitative approach to give a broad picture of current practices, challenges and lessons learned in creating the enabling environment for integrated risk governance at national and local levels. It considers the role of regional cooperation, as well as the many ways and means Member States are using to also integrate DRR into national and local plans for development, CCA, urban settings and fragile or complex contexts.

1 (Cornish 2005)

Enabling environment and regional cooperation

The Sendai Framework promotes regional and national cooperation, particularly in Priority 2, which speaks of "disaster risk governance at the national, regional and global levels". Global and regional mechanisms are therefore important elements of the enabling environment for effective risk governance at national level. As the technical support systems and resources around the Sendai Framework monitoring processes have been discussed previously, it is timely to recognize the support and resources that Member States access through their regional organizations and agreements, as well as the governance frameworks they have put in place at national and local levels. Accordingly, the first chapter of this part looks at progress in the enabling environment created by Member States through regional plans, strategies and knowledge-sharing.

Disaster risk reduction strategies or plans aligned with the Sendai Framework

Achievement of Target E by 2020 is a marker of progress and an essential element of the enabling environment to achieve all the Sendai Framework targets and goal by 2030. With only a year to go until 2020 and only 11 years until 2030, it is now a matter of urgency for countries to set themselves more ambitious priorities by updating their existing strategies and plans to pursue prospective risk management objectives that can access public and private investments.

Recognition of the importance of national and local DRR strategies is not new and was already highlighted during the HFA implementation period, albeit without a dedicated target. By the end of the implementation period of HFA in 2015, 94 of the 105 countries that made progress reports in the 2013–2015 period reported having legislative and/or regulatory provisions for managing disaster risk,[2] and 69 countries reported having national strategies and plans. There was no official record of local DRR strategies, as this has only been monitored systematically since 2015. However, as documented in GAR15, most national DRR strategies and plans endorsed under HFA were primarily focused on disaster preparedness and on reducing existing risk. Now, unless countries can curb the creation of new risk, the goal of the Sendai Framework is unlikely to be achieved by 2030.

It is also important to heed one of the lessons from the implementation period, which was that many excellent DRR strategies were developed but not implemented because a country either lacked the resources or political support, and stakeholder awareness were not present.[3] Plans and strategies need to be practical in the country context, not only aspirational. To be effective, they need to engage relevant stakeholders and be developed and implemented with sufficient resources, capacity and commitment. Chapter 11 looks at selected country practice in developing and implementing national and local plans.

Risk reduction in development planning

Unless nations accelerate their efforts to curb the development-based drivers of risk, the sustainability of development will be at stake. Also at stake is the need to hold on to the many co-benefits that DRR may bring to sustainable development.[4] GAR15 stated that annual global investment of $6 billion in appropriate DRR strategies would generate total benefits in the realm of $360 billion.[5]

The 2030 Agenda recognizes that disasters threaten to reverse much of the development progress in recent decades.[6] Building the resilience of development assets to shocks and disasters, and reducing the disaster risks inherent in new investments is therefore a logical and important course of action. But it is not enough to address the risk of disasters to development, as many risks arise from development. Development can be a major driver of disaster risk, resulting in populations and economic assets located in exposed geographic areas, accumulation of risk in urban areas due to rapid and unplanned development, overreliance on natural resources and degradation of ecosystems, and

social inequalities due to limited income-generating opportunities for some population groups.

There are sectoral development dynamics that are contributing to risk, such as tourism development in hazard-prone coastal areas or farming of water-intensive crops in drylands, as well as the wider consequences of climate change.[7] Development patterns that increase inequalities result in poverty and also create processes of social and political exclusion, which drive disaster risks.[8] This makes social justice and equality core values for disaster- and climate-resilient development, as they ensure that options, visions and values are deliberated, among and within countries and communities, without making the poor and disadvantaged worse off.[9]

Flooding in Jakarta
(Source: World Bank)

The potential to stimulate economic activity by reducing disaster risk is yet to be fully understood. However, it can create a conducive environment for public and private investment, as well as livelihoods investment at the household level. This is not the sole responsibility of government, as disaster risk and climate change need to be considered in business continuity management by large and small enterprises; this is now recognized increasingly in the private sector.[10]

2 (UNISDR 2019b)
3 (Jackson, Witt and McNamara 2019); (UNISDR 2015b)
4 (Tanner et al. 2015)
5 (UNISDR 2015c)
6 (United Nations General Assembly 2015a)
7 (Leahy 2018)
8 (UNISDR 2015c)
9 (Centre for Science and Environment 2018)
10 (ADPC and iPrepare Business facility 2017)

Despite the growing political commitment to integrating DRR into development as reflected in the Sendai Framework and other global and national policy frameworks, the working knowledge of how to mainstream DRR in practical and effective ways is still uneven across countries. The mechanisms explored in Chapter 12 are intended to illuminate how to achieve this in practice through integrated national and local plans and strategies, now that it has become so clear through the post-2015 agendas that risk-informed development is the only type of development that is sustainable.

Risk reduction and climate change adaptation

The idea of converging DRR and CCA agendas has been gathering interest progressively, conceptually and in practice at international, national and subnational levels. These efforts share the common aim of building resilience of people, economies and natural resources to the impacts of extreme weather and climate.

At the global level, the integration of DRR with CCA has been a key component of decisions under UNFCCC since the 2007 Bali Declaration, as well as the outcomes of the 2012 United Nations Conference on Sustainable Development (Rio+20), and of course the post-2015 agreements already discussed. The Sendai Framework gives explicit recognition of the importance of CCA in calibrating DRR.[11] However, especially in light of the 2018 IPCC special report Global Warming of 1.5°C (IPCC SR1.5), action on climate change is now understood as an urgent global and national priority for risk reduction strategies and plans.[12]

The impacts of climate change are already being felt in many regions of the world. Current projections make it clear that, without concerted action on climate change, the goal of sustainable development cannot be achieved, many societies are likely to face significant reversals and the longer-term survival of the human species on the planet is under threat. Climate change is already causing shifts in average conditions, more-frequent and more-intense weather events, and sea-level rise. It is expected to further exacerbate weather-related disasters in the coming decades, leading to losses that could soon erase development gains in key sectors,[13] with cascading impacts on human health and food security, and many related ecosystems and human-made structures and systems.

Countries that face high risk from impacts related to climate change and other natural and human-made hazards have tended to prioritize development of stand-alone CCA strategies and plans, rather than integrating them with DRR strategies, especially if resources and capacities are limited and external financing is more readily available for CCA. Some national CCA strategies and plans have integrated DRR, especially in the Pacific. However, it is time for a more fully integrated approach to the combined risks each country faces – short and long term. As reiterated in earlier parts of this GAR, the systemic nature of risk requires systems-based approaches; climate risk needs to be a part of all development and risk reduction planning.

Local disaster risk reduction strategies and plans in urban areas

Much of the world's population – 4.22 billion, or 55.3%[14] – now lives in urban areas. By 2050, it is expected that 66% of the population will be living in cities, urban centres, peri-urban areas and agglomerations. Most of this growth will take place in cities in Africa, Asia and Latin America, where the expansion rate of informal settlements is high and capacities for urban management are limited. As of 2014, the urban slum population worldwide was 880 million.[15] At the same time, displacement patterns are changing. UNHCR figures indicate that "one in every 122 people in the world is now either a refugee, internally displaced, or seeking asylum, while 6 out of 10 refugees and at least half of all internally displaced persons (IDPs) are located in urban areas, in cities and towns across the globe."[16] In addition to changing the entire landscape of cities, it also adds context-specific vulnerabilities, which were previously absent or exceptional, and reduces the capacity of local governments to understand and manage risk.

The physical and spatial characteristics of cities, their settlement patterns, the standards of their built environment, socioeconomic vulnerability and poverty of urban residents, and environmental challenges are some of the risk drivers that thrive in rapidly developing urban areas. Unplanned expansion of cities to accommodate rising populations often gives rise to inappropriate land use, where vulnerability to climate change impacts combines with poor infrastructure and services. Frequently, a lack of appropriate building codes and challenges in regulating compliance with existing building standards further increase risk. The risks from inadequate living conditions, poor health, inadequate nutrition, poverty and poor sanitation are magnified during events such as floods and heatwaves. Indeed, under changing climate conditions and the extension of coastal cities, "heat-waves, drought, heavy downpours, and coastal flooding are projected to increase in frequency and intensity in many cities over the twenty-first century, adding to the risk of urban residents."[17] Urbanization and the complex characteristics of cities can increase vulnerabilities and risk to natural hazards and climate change; at the same time, they can also present opportunities for sustainable development. National urban policy is identified as a key instrument for governments to support the implementation of NUA, SDGs and DRR in line with the Sendai Framework. The 2016 United Nations Conference on Housing and Sustainable Urban Development (Habitat III) considered an assessment of the state and scope of national urban policies across 35 OECD countries, based on data collected by UN-Habitat.[18] Those countries implementing national urban strategies understand that there is a strong economic argument for doing so, with urban areas contributing an increasingly higher proportion of GDP as urbanization proceeds. If policy and financial support is given to urban areas to understand and effectively reduce or manage climate and other risks, then this improves the area's economic competitiveness, brings businesses in, attracts investment capital, creates jobs, and improves tax revenue and services.[19]

Increasingly urban areas and cities may look to bond financing to improve infrastructure. However, in the past five years, credit ratings agencies have issued warnings about or guidance on municipal credit ratings and climate change. Cities may be downgraded if they are not managing and reducing risk, so this reinforces the need for national governments to support cities through national urban policies to help them attract investments needed for resilient development.[20]

Local and urban strategies and plans[21] need to address these risk drivers to reduce current risk and prevent future risk creation, and to move towards inclusive and equitable urban development, which can be more resilient and sustainable.[22] If these challenges of rapid urban growth are not addressed, the greater exposure of people and assets (physical, cultural and economic) and higher frequency of extreme events can create an explosive combination of risk with potentially disastrous consequences from which it is hard to recover.

Disaster risk reduction strategies in fragile and complex risk contexts

Contexts in which disaster risks manifest, and local and national DRR strategies are designed and implemented, are increasingly complex. However,

11 (UNISDR 2017a)
12 (IPCC et al. 2018); (IPCC 2018); (Centre for Science and Environment 2018)
13 (IPCC 2012); (IPCC et al. 2018)
14 (UN DESA 2018b)
15 (UN-Habitat 2015); (Sarmiento et al. 2019)
16 (Global Alliance for Urban Crises 2016); (Crawford et al. 2015); (Internal Displacement Monitoring Centre 2015)
17 (Rosenzweig et al. 2018)
18 (OECD 2017b)
19 (OECD 2017b)
20 (OECD 2017b)
21 (UNISDR 2018a)
22 (Gencer 2013); (UNISDR 2017c); (OECD 2017b); (The Economist Intelligence Unit Ltd 2013)

most tools and guidelines designed to facilitate the development of such strategies consider only conducive, "normal" development, non-crisis and non-complex risk scenarios. Decision makers have to contend with existing known dynamic development trends, together with new threats such as climate change, and emerging threats, which are yet to be realized.[23] Entities such as the World Bank, OECD and the World Economic Forum have, for some time, sought to identify major threats posing challenges to development progress.[24] Most recently, these have included: global economic and financial instability, international criminal activity and terrorism, severe environmental change including climate and oceanic change, cyberfragility and technological disruption, geopolitical volatility, growing antibiotic resistance, pandemics – and of course, natural hazards.[25] The interaction of such threats and risk drivers creates complex risks that already have a significant bearing on the environment in which DRR, the development and implementation of national and local DRR strategies, and therefore the attainment of the Sendai Framework Target E is sought.

Understanding complex risks is important when developing local and national DRR strategies as these complexities influence the context in which disaster risk manifests, by altering patterns of hazards, exposure, vulnerabilities and capacities to cope. Policies are commonly designed where value-laden, subjective assessments of risk – influenced by nuances in risk perception and risk tolerance – come to bear. Implementation takes place where the trade-offs inherent in development trajectories shape the barriers and incentives for advancing progress on DRR, and where decisions that lead to the creation of new risk materialize. Those concerned with attaining DRR therefore need to begin moving towards a deeper understanding of complex risk, adopting systems thinking, and using interdisciplinary insights and knowledge, across spatial and temporal scales, to more effectively deal with uncertainty. DRR is one well-known demonstrated means to reduce and manage risks related to natural hazards, with much to offer the wider world. There is a growing understanding within the DRR community that DRR approaches can be applied to reduce and manage risks beyond natural hazards. This is reflected in the expanded scope of the global framework, wherein the Sendai Framework includes natural and man-made, biological, technological and environmental hazards, leading to slow- and rapid-onset, large- and small-scale disasters.

23 (Opitz–Stapleton et al. 2019)
24 (Opitz–Stapleton et al. 2019); (World Economic Forum 2018); (OECD 2018c)
25 (UNISDR 2015d)

Chapter 10: Regional support and national enabling environments for integrated risk reduction

10.1

Regional support for integrated risk reduction

The Sendai Framework calls on Member States to establish common platforms to exchange good practices and experiences relating to common and transboundary disaster risk, emphasizing the importance of regional and subregional DRR strategies and mechanisms for cooperation. In this way, regional cooperation is recognized as an important element in creating the enabling environment for effective DRR at national level, especially for small States and developing economies.

While recognizing that Member States have the primary role in implementing the Sendai Framework, regional organizations are able to support efforts with regionally focused strategies and frameworks, tailored risk information, risk-sharing mechanisms, tools and capacity-building on DRR. They do this through pooling regional capacity and resources and also by accessing international funding and technical assistance. Regional organizations are especially important for smaller developing States, which do not individually have the economic means to invest in such a range of tools, but are more able to bring their voices and experience to regional processes in developing the systems and capacity most useful to them.

In most regions with high exposure to natural hazards there are already intergovernmental

organizations and mechanisms in place for coordination on DRM. Therefore, the regional focus for supporting Sendai Framework implementation has been ensuring existing organizations have updated DRR mandates to align with its goal and priorities. Specifically, regional intergovernmental organizations can play a practical role in national compliance with Target E, by building capacity and supporting the development and implementation of national and local DRR strategies and plans. They can also lead and support their Member States to integrate DRR into risk-informed development planning, CCA and risk financing, as well as agree on approaches and coordinate action on shared regional and transboundary risks.

In addition to treaty-based regional organizations, the regional platforms on DRR facilitated by UNDRR to consult with and support Member States are another important mechanism for information sharing and capacity-building to implement the Sendai Framework. Regional platforms became an established mechanism during the HFA years 2005–2015, and these continue under the Sendai Framework. They have already produced or approved important regional strategies and plans on Sendai Framework implementation, also engaging at the political level with regional intergovernmental organizations.

Regional platforms for DRR are not fixed in the breadth or narrowness of focus or who can be involved. For example, an innovation in 2018 was the first combined Africa-Arab Platform on Disaster Risk Reduction. This provided these two very large regions, which face significant drought, aridity, refugee and migration issues, with opportunities to share knowledge, experiences and best practices in advancing DRR in the context of the Sendai Framework.[26] In contrast, the second Central Asia and South Caucasus (CASC) Sub Regional Platform also held in 2018 is an example of a subregional focus, with an emphasis on DRR integrated with development planning.[27]

Regional strategies and plans are not intended to supersede or substitute for national strategies and plans. Instead, they support and complement them by providing guidance and coherence, promoting collaboration and exchange, or addressing issues that cross national borders, for which a joint approach can create synergies, comparative advantages or economies of scale. For example, the Treaty of Lisbon (2009) mandates the EU "to foster cooperation, effectiveness, and consistency in disaster risk management among member countries."[28] In line with the African Union (AU) Africa Regional Strategy for Disaster Risk Reduction,[29] the Programme of Action for the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 in Africa[30] calls for integration of DRM into policies of the member countries, but leaves the responsibility of implementation with national governments.[31] There are also other types of regional partnerships that go beyond governmental arrangements, such as the ISDR Asia Partnership (IAP), which is an informal multi-stakeholder forum of Asian governments and stakeholders to facilitate DRR. IAP has been the main consultation forum for the Asia Ministerial Conferences, which operate as the Regional Platform in Asia, and is made up of regional intergovernmental organizations, governments, civil society organizations, United Nations and international organizations, and bilateral and multilateral donors.[32] Similarly innovative is the Pacific Resilience Partnership, a multi-stakeholder partnership established by Pacific leaders in 2017 for an initial trial period of two years, to support implementation of the 2016 Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management 2017–2030 (FRDP).[33] This is discussed further in section 13.5.1 on the Pacific region approach to integrated DRR development and action on climate change.

In addition to such broad-spectrum regional cooperation on risk reduction and integration with development planning and climate change, there are also many instances of regional action within sectors, on particular issues or even for smaller climatic or geological subregions. For example, the Mekong River Commission for Transboundary Development allows the four member countries of Cambodia, Lao People's Democratic Republic, Thailand and Viet Nam to cooperate on sustainable development and

hydrological/climate risks in the transboundary river basin.[34] An example of sectoral coordination is the Central American Council for Agriculture concerning disaster risk in rural development,[35] based around the Central American Strategy for Rural Development, which aims for stronger relationships with other risk management instruments, highlighting the issues associated with integrated water resource management and climate change. It dovetails with the Central American Policy on Comprehensive Disaster Risk Management (PCGIR)[36] and the Central American Forestry Strategy.[37] Some cooperation relies on the regional level to magnify and complement national efforts, such as risk

Media winners at the Africa and Arab States Regional Platform, 2018
(Source: UNDRR)

reduction, warning systems and management of regional and transboundary hazards. Following the 2004 Indian Ocean tsunami, networks of national, regional and eventually global seismic and observational monitoring systems were set up to allow early warnings to reduce the impacts of tsunamis (as discussed in Chapter 3). The Indian Ocean Tsunami Warning and Mitigation System is an example,[38] as is the Indian Ocean Tsunami Information Center, which is not part of a warning system but shares

26 (AU 2018)
27 (UNISDR 2018a)
28 (Morsut 2019)
29 (AU and UNISDR 2018)
30 (AU 2016)
31 (Omoyo Nyandiko and Omondi Rakama 2019)
32 (AMCDRR 2016)
33 (SPC 2016)
34 (Mekong River Commission for Sustainable Development 2018)
35 (Central American Council for Agriculture 2010)
36 (Coordination Center for the Prevention of Disasters in Central America 2010)
37 (Central American Council for Agriculture 2010)
38 (Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System 2019)

knowledge and builds capacity.[39] National meteorological and hydrological services are also cooperating to provide earlier warning and more complete data for regional extreme weather warnings,[40] while other initiatives take a regional multi-hazard approach.[41]

Disaster risk financing was noted in section 8.4 as a growth area in international development cooperation requiring more detailed analysis for future monitoring of Sendai Framework Target F. It is also an area where regional mechanisms are being established in addition to global mechanisms, especially in highly exposed regions. Examples include: the Caribbean Catastrophe Risk Insurance Facility established in 2007 as a parametric insurance facility;[42] the African Risk Capacity, a specialized agency of AU established in 2012, and the related African Risk Capacity Insurance Company;[43] the Pacific Catastrophe Risk Insurance Company, which was set up as a multinational sovereign risk pool in 2012;[44] and a new ASEAN facility, the Southeast Asia Disaster Risk Insurance Facility currently being piloted.[45] ESCAP has recently identified significant areas for regional cooperation in the Asia–Pacific region on risk financing.[46] The importance of disaster risk financing for national- and local-level implementation of the Sendai Framework is also considered in Chapter 12, which describes how financing can be an entry point for mainstreaming DRR into development (see section 12.3.5).

There are many types of partnerships and mechanisms for regional cooperation and planning for DRR. The Sendai Frameworks encourages new partnerships and networks, as well as reliance on more traditional intergovernmental processes. New models may be needed to work across sectoral silos and different geographic areas and timescales, to step outside "business as usual" and apply systems thinking to address immediate and long-term risk.

The following overview of key regional mechanisms and the roles they play in supporting Member States in implementation of the Sendai Framework in each global region, focuses on: (a) regions that have high exposure to natural hazards and significant numbers of smaller and/or lower-income States and (b) innovation in regional support for integrated risk governance across the post-2015 frameworks. For these reasons, developments in Africa, South-East Asia, Central America, the Caribbean and the Pacific are given more attention.

10.1.1

Africa

Natural and human-made hazards in Africa, such as drought, floods, cyclones, earthquakes, epidemics, environmental degradation and technological hazards are a springboard for disasters. Although efforts to reduce exposure and vulnerability, underpinned by accountability at all levels, are predicted to reduce disaster risks, economic losses are mounting and disasters have become a barrier to sustainable development.[47]

One of the two declarations adopted at the Africa-Arab Platform on Disaster Risk Reduction 2018 was the Tunis Declaration on Accelerating the Implementation of the Sendai Framework and the Africa Regional Strategy for Disaster Risk Reduction. This reaffirmed the urgency of implementing the strategy first adopted in 2004,[48] and supported the 2016 Programme of Action for the implementation of the Sendai Framework in Africa. The Programme of Action had already received support at the political level.[49] The Programme of Action's objectives are to: (a) increase political commitment to DRR; (b) improve identification and assessment of disaster risks; (c) enhance knowledge management for DRR; (d) increase public awareness of DRR; (e) improve governance of DRR institutions; and (f) integrate DRR in emergency response management. It builds on the intergovernmental work on DRR of AU and the Regional Economic Communities in Africa.

The Programme of Action is specifically linked to reporting under the Sendai Framework, with the monitoring and reporting system validated through formal agreement with AU member States. The AU Commission monitors progress of Regional Economic Communities towards the Programme of

Action goals. The Regional Economic Communities then guide its implementation at the subregional level, in cooperation with their respective member States. Progress will be reviewed using existing global and regional monitoring systems and mechanisms, with each member State and Regional Economic Community expected to submit a biennial report through SFM. The reports generated will support the monitoring of progress under the Sendai Framework and the Programme of Action.[50] The monitoring information also supports DRR ministerial meetings, the Africa Regional Platform, the Africa Working Group on Disaster Risk Reduction, and review processes and DRR programming at all levels. It is thus a multilevel regional mechanism that supports Member States with information and tools for implementation, facilitates subregional and regional cooperation through Regional Economic Communities and AU Commission roles and regional platforms, and also supports reporting under the Sendai Framework.

The AU regional approach has created an enabling environment for Regional Economic Communities and member States to pursue DRR policies and strategies with a focus on regional risks and using existing institutional structures. Each Regional Economic Community therefore has its own methods and mechanisms.

SADC already had a strategic plan aligned to HFA and the 2004 Africa Regional Strategy. Then in 2016, the SADC Council of Ministers approved the Sendai Framework aligned SADC Regional Disaster Preparedness and Response Strategy 2017–2030. An SADC draft DRR strategic plan 2017–2030, and a regional DRR and CCA study are pending SADC Council approval.[51] In 2018, the SADC Regional Disaster Risk Reduction Conference recognized the importance of regional strategies, plans and frameworks, but also urged SADC to move beyond these to help accelerate implementation of the Sendai Framework, along with SDGs and the other key post-2015 framework agendas.[52]

In the Horn of Africa, IGAD has had a regional focus on drought risk through the IGAD Drought Disaster and Resilience Initiative since 2011,[53] and ECOWAS has had in place its Policy for Disaster Risk Reduction since 2006.[54] Neither of these Regional Economic Communities has yet adopted new subregional policies based on the Sendai Framework, although the IGAD drought initiative is an ongoing approach that seeks to address the effects of drought and related shocks in the IGAD region in a sustainable and holistic manner. The initiative still serves as a common framework for developing national and subregional programmes designed to enhance drought resilience through building sustainability in the region. IGAD also engages at a practical level, for example through the project Building Resilience to Disasters through Risk Management and Climate Change Adaptation, implemented with GFDRR and the National Meteorological and Hydro Metrological Services.[55] This is evidence of an integrated approach to climate and disaster risk, in line with the broader post-2015 frameworks.

ECOWAS has also focused on practical implementation of the Sendai Framework, including

39 (International Oceanographic Commission and UNESCO 2019)
40 (WMO 2018)
41 (Regional Integrated Multi-Hazard Early Warning System 2019)
42 (CCRIF 2019)
43 (African Risk Capacity 2019)
44 (Pacific Catastrophe Risk Assessment and Financing Initiative 2019)
45 (ASEAN Finance Ministers' Meeting 2018)
46 (ESCAP 2018)
47 (AU 2004); (International Institute for Sustainable Development 2016)
48 (AU 2004)
49 (AU 2016); (Mauritius 2016)
50 (AU 2016)
51 (SADC 2018b)
52 (SADC 2018a)
53 (IGAD 2019); (IDDRSI 2014)
54 (Communauté économique des États de l'Afrique de l'Ouest and ECOWAS 2006)
55 (World Bank 2019)

capacity-building towards meeting Sendai Target E,[56] and advocating for improved hydrometeorological services to address the risks of flood and drought in West Africa.[57]

This small sample of regional and subregional mechanisms in Africa illustrates how they are linked into global monitoring but also have a specific geographic focus based on the shared risk of Member States in the subregions. They are thus part of the enabling environment for Sendai Framework implementation at international, regional and subregional levels, where they provide direct support and capacity-building to Member States through sharing regional expertise and accessing international resources, as well as through regional strategies.

10.1.2

Americas and the Caribbean

The Americas and the Caribbean region is highly exposed to a range of natural hazards, including drought, earthquakes, floods, forest fires, hurricanes, landslides, tsunamis and volcanoes. The El Niño and La Niña phenomena occur periodically, exacerbating the impacts of hydrometeorological events.

The sixth Regional Platform for Disaster Risk Reduction in the Americas, held in June 2018, approved the Regional Action Plan for the Implementation of the Sendai Framework.[58] It is a non-binding plan that marks a step towards wider regional efforts to support countries build community resilience and reduce disaster risk and its impacts.[59] The action plan helps further the implementation of the Sendai Framework in the Americas and the Caribbean through the identification of regional initiatives that contribute to one or more of the Sendai Framework priorities for action,[60] and it respects the whole-of-society approach that features prominently within the Sendai Framework. The initiatives it includes can be advanced collectively by Member States, civil society organizations, volunteers and other relevant actors.

Held as part of the same Regional Platform in 2018, the high-level ministerial meeting issued the Cartagena Declaration, which affirmed the region's political commitment to the Sendai Framework, including an integrated approach to the post-2015 agreements, and noted the importance of the Regional Action Plan.[61]

Caribbean

The Caribbean States were early adopters of coordinated intergovernmental approaches to managing disaster risk, faced as they are with a shared, high exposure to natural hazards and comprising mainly smaller developing economies with relatively limited resources to manage the risk.

Within the Caribbean Community institutions, the Caribbean Disaster Emergency Management Agency (CDEMA) serves 18 States, most of them lower-income countries and/or SIDS. CDEMA has supported the region since the 1990s, with tools such as its Model Comprehensive Disaster Management Legislation and Regulations 2013.[62] In the Caribbean region, the comprehensive disaster management (CDM) concept includes DRR and sustainable development, and CDEMA has operated under a CDM framework since 2001. The current CDM Strategy 2014–2024, endorsed by Member States, is in alignment with the Sendai Framework.[63]

The CDM Strategy 2014–2024 has four priority areas: (a) strengthened institutional arrangements for CDM; (b) increased and sustained knowledge management and learning for CDM; (c) improved integration of CDM at sectoral levels; and (d) strengthened and sustained community resilience. CDEMA member States report directly to CDEMA on CDM Strategy implementation through their country audits and the Performance Management Framework with a basket of indicators aligned to the indicators of the Sendai Framework's seven global targets. To support the implementation of the strategy, there is a corresponding CDEMA Corporate Plan and a CDM Monitoring Evaluation and Reporting Policy, along with country audits to identify gaps and needs at the national level, the Country Work

Programming and the overarching Performance Management Framework.

CDEMA is an example of a long-standing regional mechanism that is well adapted to meeting the needs of a group of broadly similar member States that face common regional hazards. It had already pioneered integration of DRR and sustainable development through the regional concept of CDM. CDEMA has therefore been readily able to support member States implement the Sendai Framework's integrated approach to risk governance based on the new Sendai Framework compliant regional strategy, but using existing mechanisms.

Central America

The Central American States also have long-standing mechanisms for regional cooperation and coordination in managing disaster risk. They continue to be active and innovative on Sendai Framework implementation.

PCGIR[64] was approved in December 2017 by the Heads of State of the Central American Integration System (SICA).[65] It is entirely aligned with the Sendai Framework as well as SDGs and the Paris Agreement, and serves to guide DRM at the regional and national levels, especially for the Member States that are already part of SICA specialized agency, the Coordination Centre for the Prevention of Disasters in Central America and the Dominican Republic (CEPREDENAC). First established decades ago, CEPREDENAC is the coordination mechanism among the national DRM agencies of SICA Member States.[66]

PCGIR is the main Central American regional public policy instrument for DRM within SICA, and involves five main pillars: (a) DRR in public and private investment for sustainable economic development, linked to Sendai Framework Priorities 1 and 3; (b) development and social compensation to reduce vulnerability, linked to Sendai Priorities 1, 2 and 3; (c) DRM related to climate change, linked to Sendai Framework Priorities 1 and 2; (d) land-use management and governance (linked to Sendai Framework Priorities 2 and 3); and (e) disaster management and recovery, linked to Sendai Framework Priority 4. Subsequently, a Central American Regional Disaster Reduction Plan 2019–2023[67] made under PCGIR seeks to contribute to the integration of disaster reduction into sustainable development of SICA member States, complementing such integration at the global level among the Sendai Framework and SDGs.

The Central American policy framework for DRR under the Sendai Framework has thus built upon long-standing cooperation among SICA member States, but has also extended this to support integration of the post-2015 agendas. Another source of integration is that, in addition to CEPREDENAC, SICA also has regional organizations working on environment and climate change, and water and climate. The three intergovernmental bodies that form the environmental subsystem of SICA have established a functioning mechanism with the purpose of avoiding competition and pursuing joint advocacy.

CEPREDENAC is financed by annual contributions from member States, as well as significant resources via international cooperation. It is thus also an example of a regional focus for international

56 (ECOWAS and UNISDR 2018)
57 (ECOWAS 2018)
58 (Unidad Nacional para la Gestión del Riesgo de Desastres and UNISDR 2018)
59 (UNISDR 2017c)
60 (UNISDR 2017c)
61 (VI Regional Platform for DRR in the Americas, Third High-level Meeting of Ministers and Authorities 2018); (UNISDR 2016)
62 (CDEMA 2013)
63 (CDEMA 2014)
64 (Coordination Center for the Prevention of Disasters in Central America 2010)
65 (Sistema de la Integración Centroamericana 2019)
66 (CEPREDENAC 2019)
67 (Coordination Center for the Prevention of Disasters in Central America and World Bank 2014)

investment that can be utilized efficiently by an active regional organization to better support member States. This is especially important in a region where countries face high levels of common risk, and most are developing economies with relatively small populations that would not have the national resources to develop such tools and resources independently.

South America

In South America, the four Andean Community member States of the Colombia, Ecuador, Peru and the Plurinational State of Bolivia have already adopted the Andean Strategy for Disaster Risk Management 2017–2030, which is in alignment with the Sendai Framework. It builds on the previous 2005 strategy. The new strategy seeks to strengthen institutional capacities in its member States, to enhance DRM, reduction and prevention, and to support the alignment of disaster risk information systems. It is supported by the Andean Committee for Disaster Prevention and Response. It is also intended to support the formulation and implementation of policies; including national, regional and sectoral strategies and plans on DRM that promote sustainable development and social inclusion among Andean countries, as exemplified by the Andean Disaster Risk Management Strategy's Implementation Plan 2019–2030 and its associated indicators. It thus addresses the broader 2015 agenda, while providing guidance and enhancing the capacity of its members States to implement the Sendai Framework priorities and goal as well as to meet Target E.

Within the Southern Common Market (MERCOSUR), the technical intergovernmental DRR entity is the Meeting of Ministers and High Authorities on Comprehensive Disaster Risk Management. At the time of the development of this GAR, MERCOSUR was developing its five-year risk reduction strategy.

The two long-established subregional mechanisms in Central America and the Caribbean have adapted their cooperation and capacity-building to support Sendai Framework implementation. Within South America, the Andean member States have established a new mechanism. These are very positive developments, including as they do the member States in the region that are most exposed to hazards and disaster risk.

10.1.3

Arab States

Historically, the Arab region has been exposed to seismic activity.[68] More recently, it has faced challenges stemming from secondary risks linked to the displacement of people and migration trends, the spread of epidemics, food insecurity, conflict and civil unrest, rapid urbanization, environmental degradation and water scarcity.[69]

The Arab Strategy for Disaster Risk Reduction 2030 was adopted in January and subsequently endorsed by Heads of State in April 2018 at the Arab League Summit.[70] The strategy is in alignment with the Sendai Framework and SDGs, and focuses on a multisectoral approach to substantially reduce disaster risk in the Arab region by 2030.[71] It is essentially a framework to foster progress in core agreed areas of implementation, and to produce a detailed programme of work across three phases until 2030. These will be implemented with various levels of cooperation with humanitarian and development partners.[72] An Extraordinary Session of the Arab Coordination Mechanism for Disaster Risk Reduction adopted the Phase I programme of work in January 2018.

A biennial matrix for 2019–2020 defining a road map of time-bound regional targets was also finalized and adopted as an outcome document of the 2018 Africa-Arab Platform. That platform also adopted the Tunis Declaration on Disaster Risk Reduction.[73]

The League of Arab States (LAS) coordinates further action on implementation of the regional strategy. Together with its technical organizations, LAS mainstreams DRR measures into projects and technical assistance programmes across the Arab States.

The Prime Minister of Mongolia, Khurelsukh Ukhnaa, at the Asian Ministerial Conference for Disaster Risk Reduction
(Source: UNDRR)

10.1.4

Asia and the Pacific

The Asia–Pacific region is highly exposed to hydrometeorological hazards as well as geophysical and human-made hazards. Although economically mixed, it has a high proportion of lower-income and developing economies. Located within the "Pacific Ring of Fire", many Asia–Pacific countries are confronted with persistent earthquake, tsunami and volcano risks.[74] Hydrometeorological hazards, heightened by climate change, adversely affect social and economic development. The Asia–Pacific region tops the table in terms of frequency of occurrence and notwithstanding significant progress made in DRR, still accounts for half of the global disaster impacts with respect to mortality and affected people.[75] It is therefore imperative to integrate DRR measures across development programmes and sectors, as well as in CCA.

68 (Arab Strategy for Disaster Risk Reduction 2030 2018)
69 (Arab Strategy for Disaster Risk Reduction 2030 2018)
70 (LAS 2018)
71 (Arab Strategy for Disaster Risk Reduction 2030 2018)
72 (Arab Strategy for Disaster Risk Reduction 2030 2018)
73 (AU 2018)
74 (APEC 2016)
75 (AMCDRR 2018)

Asia

In June 2014, the sixth AMCDRR and IAP agreed to develop a regional plan for the post-2015 framework. The Asia Regional Plan for Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 was then finalized and approved at the 2016 AMCDRR in India.

The Asia Regional Plan aims to provide: (a) broad policy direction to guide implementation of the Sendai Framework in the context of the 2030 sustainable development agendas in the region; (b) a long-term road map, spanning the 15-year horizon of the Sendai Framework outlining a chronological pathway for implementation of priorities to achieve seven global targets; and (c) a two-year action plan with specific activities that are prioritized based on the long-term road map and in line with the policy direction.[76] The plan emphasizes that it seeks to guide and support the national implementation of the Sendai Framework, not to replace national plans, and so it identifies priority regional activities "to support national and local actions, enhance exchange of good practice, knowledge and information among governments and stakeholders, in addition to strengthening regional cooperation to support the implementation of the Sendai Framework."

The first occasion to assess the implementation of the Asia Regional Plan came at the July 2018 AMCDRR in Mongolia. A key outcome of that meeting was the current Action Plan 2018–2020. It highlights the main milestones to be realized as the creation of national platforms and national coordination mechanisms for DRR, and the assimilation of DRR in development plans. The action plan suggests enhancing the role of the Asia–Pacific Regional Coordination Mechanism to support countries in advancing implementation of the Sendai Framework.[77]

Focusing on the economic development dimension, in 2015, APEC leaders formally adopted the APEC Disaster Risk Reduction Framework, centred on the phenomena of the "new normal", which demonstrates the rising frequency, scale and range of disasters and the ensuing disruption of interlinked production and supply chains.[78] The framework is a blueprint for scaling up disaster-resilient economies focused on inclusive and sustainable development. From this, the APEC Disaster Risk Reduction Action Plan was made to operationalize the APEC Framework, and was pledged in a 2015 Joint Ministerial Statement. Its purpose is to enhance cooperation on DRR and it will be operationalized through APEC.[79] The action plan comprises four DRR pillars, with specific areas for cooperation and activities, responsible partners, timelines and indicators.

The key Asian subregional intergovernmental organizations have long-standing mechanisms for regional cooperation on "disaster management". While inconsistent with the terminology agreed by the OIEWG and endorsed by the United Nations General Assembly, disaster management is the preferred term in the region; it also encompasses elements of DRR, more often described as mitigation.

The ASEAN Agreement on Disaster and Emergency Management (AADMER) entered into force in 2009. Its ongoing workplans emphasize disaster preparedness and response and also mitigation, but are not specifically aligned with the Sendai Framework.[80] However, the new ASEAN agreement on economic cooperation, ASEAN 2025: Forging Ahead Together, has a key objective to establish, "a resilient community with enhanced capacity and capability to adapt and respond to social and economic vulnerabilities, disasters, climate change as well as emerging threats and challenges (12.4)."[81] ASEAN and the United Nations have developed the ASEAN-United Nations Joint Strategic Plan of Action on Disaster Management 2016–2020, the third iteration of this action plan.[82] Together, these three ASEAN plans take a highly integrated approach to regional development planning and disaster management. However, while Sendai Framework implementation is noted in the AADMER Workplan and the Joint Strategic Plan of Action as an area for cooperation in disaster prevention and mitigation, it is not a central part of these plans, which are largely focused on disaster preparedness and response, and economic development.

The South Asian Association for Regional Cooperation (SAARC) also has a long-standing regional framework on disaster management,[83] but so far has not agreed a specific mechanism to support member States' implementation of the Sendai Framework.

Pacific

The Pacific Islands Forum Leaders meeting in 2012 agreed to develop a joint regional framework on climate change and DRM. This would supersede the two existing but distinct regional frameworks, namely the Pacific Islands Framework for Action on Climate Change and the Pacific Disaster Risk Reduction and Disaster Management Framework for Action, both of which concluded in 2015.

As noted above, FRDP was then developed, and endorsed at the Pacific Islands Forum Leaders meeting in 2016.[84] This is the first regional framework of its kind. It provides high-level strategic guidance to Member States and a range of different stakeholder groups on how to enhance resilience to climate change and disasters, in ways that also contribute to sustainable development.

FRDP envisions a developed and sustainable future for the Pacific region's people, societies, economies, cultures and natural environments. It calls for significant collaborative efforts from local and regional stakeholders to reduce carbon-based economic development, unplanned urbanization, destruction of ecosystems, poverty, inequality, institutional and capacity constraints, and fragmented action to strengthen resilience and sustainability and protect development gains.

FRDP is not prescriptive; rather, it suggests a set of priority actions to be used as appropriate by multi-stakeholder groups. Specific actions lean towards regional implementation, while others require further articulation at national level to ensure that context-specific priorities and needs are met.[85]

In 2018, at their meeting in Nauru, the Pacific Islands Forum Leaders reaffirmed their commitment to FRDP, recognizing "the value and importance of a multisectoral approach to addressing climate change and its impacts. Leaders acknowledged the establishment of a regional risk governance arrangement through the Pacific Resilience Partnership and the Pacific Resilience Partnership Taskforce."[86]

To support implementation of FRDP and the overall integration of risk governance agenda, the Pacific Resilience Partnership was established by Pacific leaders in 2017 for an initial trial period of two years. The partnership works to strengthen coordination and collaboration and has four main components that make up its governance structure: (a) a task force made up of 15 constituent groups (five positions for countries and territories, five for civil society and private sector, and five for regional organizations and development partners); (b) a support unit to support effective functioning of the task force; (c) a technical working group to support implementation of the three goals of FRDP; and (d) a Pacific resilience meeting that consolidates existing regional meetings focused on climate change, disaster response, preparedness and risk reduction and opens the door to stronger engagement with the wider development community.

76 (AMCDRR 2016)
77 (United Nations General Assembly 2018a)
78 (APEC 2016)
79 (APEC 2016)
80 (ASEAN 2005); (ASEAN 2016a)
81 (ASEAN Secreteriat 2015)
82 (ASEAN 2016b)
83 (SAARC 2007); (SAARC Environment Ministers 2006)
84 (SPC 2016)
85 (SPC 2016)
86 (DFAT 2018)

10.1.5

Europe and Central Asia

Much like other regions, Europe is exposed to a broad range of natural hazards such as earthquakes, drought, floods, storms, wildfire, avalanches and landslides, which persistently result in economic and human losses, as well as a range of technological hazards. In contradiction to its regional capacity, awareness of natural hazards and the existing knowledge base on DRR, data indicates that vulnerability to region-specific hazards is mounting.

EU DRM policies have laid the groundwork to implement some of the Sendai Framework recommendations, including those on ongoing civil protection, development cooperation and humanitarian aid action.[87] For DRR within its civil protection system: "The EU's modus operandi in the field of DRR is very much the EU's footprint: it gathers its member States around a common policy, shows challenges that are shared by all the member States, points out that there is the need to solve these challenges together, and provides a set of answers in the form of guidelines, financial support, exchange of knowledge and experiences at national level."[88]

The European Forum for Disaster Risk Reduction Roadmap 2015–2020 was developed to guide Europe's implementation of the four priorities of action and seven global targets of the Sendai Framework, with the two identified priority areas of: (a) development or review of national- and local-level strategies for DRR, in line with Target E of the Sendai Framework, based on the building blocks of risk assessments and disaster loss databases and (b) integration of DRR into different sectors, especially climate change and the environment.[89]

For its part, the EC has adopted the "Sendai Framework for Disaster Risk Reduction Action Plan [2016–2020]: A disaster risk-informed approach for all EU policies" to foster implementation of the Sendai Framework and other international agreements by supporting inclusion in EU policies. The action plan identifies, under each key area, a set of measures that could underpin a more integrated risk-informed policy landscape in the EU.[90] The key action plan implementation areas include: (a) building risk knowledge in EU policies, (b) using an all-of-society approach in DRM, (c) promoting EU risk-informed investments and (d) supporting the development of a holistic DRM approach.

The second CASC Sub Regional Platform held in 2018 had a subregional focus on DRR integrated with development planning.[91] The platform approved a Plan of Action,[92] a Roadmap for Cities[93] and the Yerevan Declaration containing political commitments to implement the Sendai Framework. The declaration has a focus on reaching Target E by 2020, but aims to do so "in coherence with the 2030 Development Agenda including the Paris Agreement on climate change, NUA and other relevant instruments, and to recognize the importance of engaging with local governments to implement and invest in DRR."[94]

10.2

National enabling environments for integrated risk reduction

The subsequent chapters of this part focus on Member State practice in developing and implementing risk reduction strategies and plans at national and local levels, how these are established, how they interact with planning for development and CCA, and how they operate in urban settings and fragile contexts. This approach, and the extensive use of national and local case studies, recognizes that Member States have the primary role in implementing the Sendai Framework, the 2030 Agenda and the other post-2015 agreements. Before addressing the plans and strategies, it is useful to highlight some aspects of national systems of government, law, culture and risk perception that can either enable or hinder risk reduction, and therefore the development and effective implementation of such plans. It is not possible to discuss these with any specificity at a global level, given the unique character of each country's sociopolitical and physical environment and risk profile. However, some key national factors are identified in the Sendai Framework, as they were also in HFA, that are larger than the specific targets and indicators and yet are also necessary enablers to achieve those targets.

The targets and priorities of the Sendai Framework emphasize the importance of understanding risk better, by improving risk information through monitoring, assessing, mapping and sharing (para. 14).[95] Priority for action 1 on understanding disaster risk brings this into focus as a fundamental aspect of reducing risk and preventing risk creation (paras. 21–25). Also reiterated throughout the Sendai Framework, continuing strongly from HFA, is the importance of "strengthening disaster risk governance and coordination across relevant institutions and sectors and the full and meaningful participation of relevant stakeholders at appropriate levels" (para. 14). This is a concept captured more fully under Priority for action 2 on strengthening disaster risk governance to manage disaster risk (paras. 26–28). These two aspects of the Sendai Framework require constant interaction between the creation of information and its use to reduce risk across all of society, including that which accrues to the most vulnerable, and with the participation of relevant stakeholders. These are the aspects of the Sendai Framework most relevant to enabling the development of well-informed national and local DRR strategies and plans as required by Target E, and to implementing them effectively.

Two other principles that run through the Sendai Framework need a mention in this context. The first is the issue of integration with the other post-2015 global agendas. This is not for the sake of conceptual neatness, but because the international community expressed through this and the other global agreements, the realization that integrated risk reduction and management, or a systems-based approach, is the only way to attain sustainable development in the face of disaster risk and climate change. The second is the issue of gender equality, more specifically empowering women in DRR, along with the broader notion of inclusiveness of people of all ages and abilities, as essential to understanding risk, risk perceptions and involving the whole community in deciding how to manage and reduce risk effectively. Youth and women

87 (EC 2016)
88 (Morsut 2019)
89 (EFDRR 2016)
90 (EC 2016)
91 (UNISDR 2018a)
92 (Plan of Action Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 in Central Asia and South Caucasus Region 2016)
93 (UNISDR 2015a)
94 (Yerevan Declaration 2018)
95 (United Nations 2015a)

become more of a focus when considering the Sendai Framework in light of the other agendas and the issues they address – SDG 5 on gender equality and women's empowerment for instance – and a heightened awareness of the need for intergenerational equity in responding to climate change and preventing the types of shocks that can have such a damaging and long-lasting impact on the health and well-being, education and employment opportunities of young people.

10.2.1

Legal and institutional frameworks for disaster risk reduction and development

Risk reduction strategies and plans, reduction of risk in development planning and governmental support for CCA do not occur in a vacuum. Institutional responsibility for developing, resourcing, implementing and being accountable for the

Workshop in Antigua and Barbuda
(Source: UNDRR)

effectiveness of such strategies and plans is almost invariably set out in government laws, decrees and rules at national and local levels. Indeed, the specialist institutions for DRM and CCA are often created by legislation, or where they are part of ministerial mandates, they are subject to rules and policies made under the relevant legislation.[96]

Member States do not generally establish legislation for DRR alone, and such an initiative would now run counter to the Sendai Framework's approach to integrated risk reduction, as well as to the emerging understanding of systemic risk elucidated in Chapter 2 of this GAR. DRR mandates are embedded within broader frameworks for DRR and management, and, importantly, in a range of sectoral laws that are not widely understood as risk management frameworks. These include: land zoning and land-use planning; building codes; environmental protection and anti-pollution laws, including environmental impact assessments of development projects; water resource management;

solid and liquid waste management; and fisheries, wildlife and forests. In other words, relevant legal frameworks exist for almost all elements of the wider risk scope of the Sendai Framework. The nature of these mandates, the institutions they establish, the resources allocated, and the way they communicate and work together as a system, are the essential infrastructure for effective risk governance to address systemic risk.[97]

Research shows that there are few cross-sectoral linkages, and often few opportunities for non-governmental stakeholders to participate in risk governance through public institutions. Yet, these are fundamental to either enabling or creating barriers to effective and participatory risk management strategies at national and local levels. There is extensive research and practical tools available to Member States wishing to undertake assessments of their legal frameworks for effective DRR,[98] including many specific country case studies.[99] Further analysis is available for particular focus areas, such as the legal and institutional enabling environment for SME disaster resilience in Asia, which considers the existing and additional needs for integration in the areas of DRM, CCA and business development.[100]

10.2.2

Inclusion and equality

The Sendai Framework calls for a people-centred, inclusive and non-discriminatory approach to DRR that pays special attention to people disproportionately affected by disasters. It specifically notes the importance of involving "women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples … and older persons in the design and implementation of policies, plans and standards." (Para. 7).

It is well established that through direct and indirect losses to infrastructure, livelihoods and opportunities, disasters compromise the capabilities of communities to lead a dignified life and realize their aspirations. They undermine sustainable opportunities for development. Inclusion of all relevant stakeholders and principles of equality are therefore essential to understand the way these systemic risks affect different groups within the population, and what to do about it. DRR needs to take account of a range of socioeconomic sources of vulnerability, including age (children, youth and older persons), disability, ethnicity, poverty, and in circumstances of gender inequality, women as a group.

Gender equality and empowerment

Women as a group are not intrinsically vulnerable, but differentiated gender roles and gender inequality have shown that disasters often have greater socioeconomic impacts on women than on men,[101] as well as higher risk of GBV.[102] In some contexts, women have higher rates of death and injury,[103] as observed in some populations affected by the 2004 Asian tsunami.[104] This can however be very culturally and context specific (e.g. in Hurricane Maria in Puerto Rico, men over the age of 65 had the highest mortality).[105] An essential step in ensuring effective risk reduction is to engage women so that their experience of risk is a default input to global, regional, national and local strategies for risk reduction, sustainable development and climate change. This is recognized in the Sendai Framework, and in greater detail in the 2030 Agenda through SDG 5 on gender equality and women's empowerment. These goals are to be realized through increasing women's participation and decision-making roles in the relevant institutions and processes.

96 (IFRC and UNDP 2014b)
97 (IFRC and UNDP 2014b)
98 (IFRC and UNDP 2014a)
99 (IFRC 2016a)
100 (ADPC 2017b)
101 (IFRC 2017)
102 (IFRC 2015); (IFRC 2016b)
103 (Neumayer and Plumper 2007)
104 (Nishikiori et al. 2006)
105 (Santos-Burgoa et al. 2018)

SDG 5 aims to "to achieve gender equality and empower all women and girls."[106] Target 5.5 of SDG 5 is to "Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life." Its achievement will be measured by the quantitative indicators of: the proportion of seats held by women in national parliaments and local governments, and the proportion of women in managerial positions.[107] National governments and legislatures are, of course, free to set higher targets; indeed, many do set targets on women's participation in government administration through their national development plans, but they also need to develop ways to implement them.

In light of SDG 5, the Regional Asia-Pacific Conference on Gender and Disaster Risk Reduction issued clear recommendations – the Ha Noi Recommendations – on implementing the Sendai Framework to promote gender equality.[108] Of particular relevance to risk governance, law and policy, the conference recommended that governments:

- Seek to understand risk, including by mandating up-to-date national and local statistics disaggregated by sex, age and disability, as well as developing socioeconomic baselines to inform gender-responsive DRR;
- Conduct gender analysis of disaster risk to inform national and local policies, strategies and plans;
- Implement strong laws that mandate women's participation and leadership in decision-making and also create accountability for their implementation;
- Invest in social protection and social services that reduce gender inequality and other inequalities and enable at-risk groups of women and men to mitigate disaster risks and adapt to climate change;
- Implement security and protection interventions led by women to reduce current risks and prevent creation of new risks arising from gender-based discrimination and violence.

Finally, the recommendations emphasize the need to "institutionalize" the leadership of women and diverse groups in disaster preparedness, response, recovery and reconstruction, and propose that at least 40% of the composition of national and local mechanisms responsible for developing disaster preparedness, response and recovery decisions must be made up of "women and diverse groups".[109]

The careful analysis of the Sendai Framework by the Ha Noi Recommendations applying the lens of SDG 5, gives Member States some practical options to address representation of women in developing national and local risk reduction strategies, and to engage women in needs assessments. Both these elements can provide a fuller picture of the systemic risks faced by women due to gender inequality. Recognition of the differentiated impact of disasters and targeted actions is a prerequisite for an inclusive approach.

Protection of children and participation of young people

As discussed in Chapter 3 of this GAR, disasters affect individuals in different ways at different stages of their life cycle with compounding effects. While being a child does not define vulnerability, the ability of children and young people to cope when risk is realized can often be surpassed. Children are at increased risk of being separated from their parents, family members or carers during disasters; the cause of deep distress, such separation can have a severe and long-lasting negative effects on mental health and development. Unaccompanied and separated children may face greater risks to certain threats; threats that may include abduction, trafficking, sale, illegal adoption, sexual and GBV (including child prostitution and child marriage), physical violence and neglect have all been observed in the aftermath of disasters.[110] Having risk reduction strategies that incorporate aspects of child protection can help to prevent and mitigate some of these impacts on children.

Children's vulnerability profiles in the aftermath of a disaster are often correlated with increased

risk of disease and malnutrition, which may trigger interruption of schooling trajectories, ill-developed social and cognitive skills. These are highly likely to affect their capabilities to attain the skills necessary to achieve their full earning potential, and in turn send their children to school, etc. Worldwide evidence highlights that persistence of inequity in enrolment, attendance, learning outcomes and achievement based on gender, poverty, exposure to natural hazards, etc., are all determining factors in defining which children attend what kind of school and for how long.[111] In addition, malnutrition in early childhood is likely to impair cognition; children who do not complete primary school are likely to earn less money in their first job than those with higher levels of education. In essence, children who are forced to drop out of school at an early stage, or who never enrol in school, will likely never attain the skills required for them to achieve their full earning potential.

The needs and interest of young adults are also of concern in the broader post-2015 agendas, particularly considering the potential impacts of climate change.[112] Climate change, sustainable development and disaster risk all raise the compelling issue of how to ensure intergenerational equity. Engagement with young adults and ensuring they are represented in planning and decision-making processes on risk reduction are important elements in ensuring their futures.

Groups with limited mobility and access to information

Very young children, older persons with limited mobility[113] and people with disabilities and their carers (most of whom are women) can be at a significant disadvantage in disaster situations.[114] Physical mobility issues can reduce their capacity to evacuate. Invisible disabilities such as hearing or sight impairment and intellectual disabilities can reduce people's capacity to receive and understand risk reduction education, participate in drills, early warning and evacuation instructions, as well as to move around in chaotic circumstances.[115] Prior planning, preparedness and risk reduction for these groups should be undertaken in a participatory fashion with the persons concerned or their advocates, to ensure that their needs are considered in advance, and that plans and strategies are effectively inclusive.

Access for the poorest and most marginalized groups

Other groups – that are commonly marginalized in community DRR, as well as during disasters – also have diverse skills and knowledge to contribute in planning for risk reduction. These include: migrants, who may have limited knowledge of local hazards, institutions and services and may not have social and family support networks, but may also bring new knowledge and skills from previous experiences;[116] indigenous peoples, who may be socially or economically marginalized, but also hold traditional knowledge of relevance to risk reduction;[117] and the very poorest people, who may be housed in poor quality dwellings or informal settlements, but may also have developed numerous individual and communal survival and organizing skills.

The central message from the Sendai Framework on these issues is that equality and effectiveness in risk reduction is reached through inclusion of all stakeholders. When certain groups are omitted, the

106 (United Nations General Assembly 2015a)
107 (United Nations Economic and Social Council 2017a)
108 (UN Women and Viet Nam Central Steering Committee for Natural Disaster Prevention Control 2016)
109 (IFRC 2017); (UN Women and Viet Nam Central Steering Committee for Natural Disaster Prevention Control 2016)
110 (Uppard and Birnbaum 2017)
111 (UNICEF 2017)
112 (UNICEF 2015)
113 (HelpAge International 2012)
114 (Matsuzaki, n.d.)
115 (Handicap International 2015)
116 (Guadagno 2017)
117 (United Nations General Assembly 2014a)

strategies and plans that ensue are often less effective. Ignoring or omitting the acquired experience of risk and disaster impacts of such groups, can result in impacts that are unequal, even discriminatory.

Inclusion and empowerment of women, vulnerable groups, people with disabilities and socially marginalized people within national frameworks of law, policy and institutions underpin effective risk reduction and uphold the all-of-society tenets of the Sendai Framework and "leave no one behind" principle of the 2030 Agenda.

10.3

Conclusions

Regional and national frameworks are important aspects of the enabling environment for successful risk reduction by Member States.

Regional intergovernmental organizations, regional platforms on DRR and new forms of partnership within global regions allow Member States and other stakeholders to pool resources and capacities to support national and local risk reduction. They also provide mechanisms to focus on specific regional risks. The foregoing account indicates a high degree of engagement and activity at regional level to support implementation of the Sendai Framework. These processes are now at the stage, with strategies and mechanisms in place, where the focus can shift to practical support to Member States' efforts in implementation, supplemented by regional and cross-border risk reduction efforts.

The primary responsibility for Sendai Framework implementation lies with the Member States. The broader national framework of laws, policies and institutions for risk reduction, development and action on climate change have a significant impact on States' ability to formulate and implement national and local strategies and plans on DRR, development and CCA. Such overarching frameworks are key in empowering and including all stakeholders, establishing the basis for gender equality, and for including people and groups more exposed and more vulnerable to disaster impacts than the wider population.

The legislative, policy and institutional structures and processes that include the views and experiences of women and girls, people with disabilities, older persons, and for example, people from different ethnic or religious backgrounds, and which include protection measures for children, result in measures at national and local levels that allow a more equal and more effective reduction of risk.

These enabling frameworks can be understood as central components of national and local plans for DRR, development, CCA and the emerging integrated approaches to risk reduction, which are discussed in the following chapters.

Chapter 11: National and local disaster risk reduction strategies and plans

The development of national and local DRR strategies and plans by 2020 is a dedicated target in the Sendai Framework (Target E). Compared with the other global targets, which are due by the end of the agreement in 2030, the 2020 deadline for DRR strategies and plans was established in recognition of their importance as enablers to reduce disaster risk and loss. This chapter complements the Sendai Framework monitoring data reported in Part II with examples of the challenges, lessons learned and emerging good practices at country level.

11.1

Sendai Framework monitoring data on Target E

As discussed in Part II above, the Sendai Framework monitoring system shows that 47 Member States reported on Target E in 2017 in relation to national strategies (Indicator E-1). This is a significant increase compared with 27 countries in 2016, but at 25% of the total falls well short of what is required by 2020. Of these, 6 countries reported that they have national DRR strategies in comprehensive alignment with the Sendai Framework, while 16 reported substantial-to-comprehensive alignment, 15 moderate-to-substantial alignment, and 7 moderate alignment; 3 of the 47 reported limited or no alignment. However, using other sources of State self-reporting in addition to the formal SFM, the number is much higher. One hundred and three countries report having a national DRR strategy at some level of alignment, including 65 Member States that rated their alignment as above 50% (moderate to complete).[118] This number is much more significant as it represents more than 50% of the United Nations Member States (Chapter 8 Target E: Progress on disaster risk reduction strategies for 2020. Indicator E-1).

118 (United Nations General Assembly 2018a)

Target E also has an indicator on local strategies (Indicator E-2). It requires countries to report on the proportion of their local governments that have local DRR strategies. SFM indicates that 42 countries reported on local strategies. Of these, 18 reported that all their local governments have local strategies aligned with their national such strategies, and 7 reported no local strategies (or none aligned with their national strategies) (Chapter 8 Target E: Progress on disaster risk reduction strategies for 2020. Indicator E-2).

Although the data on Target E thus remains partial, it indicates attention to the issue of aligning national and local DRR strategies and plans with the Sendai Framework, as well as suggesting there is still some way to go to meet this target by 2020. That said, it is also important to recognize that these indicators are not designed to provide detail on the challenges countries face and what innovations and good practices they are developing to create the right enabling environment to reduce risk along the way to meeting the target. The essential purpose of asking for national and local strategies to be developed and implemented in alignment with the Sendai Framework is to create the optimal enabling environment to enable the wide range of risks addressed in the Sendai Framework to be reduced. It is therefore important to look at the ways countries have tackled this issue.

11.2

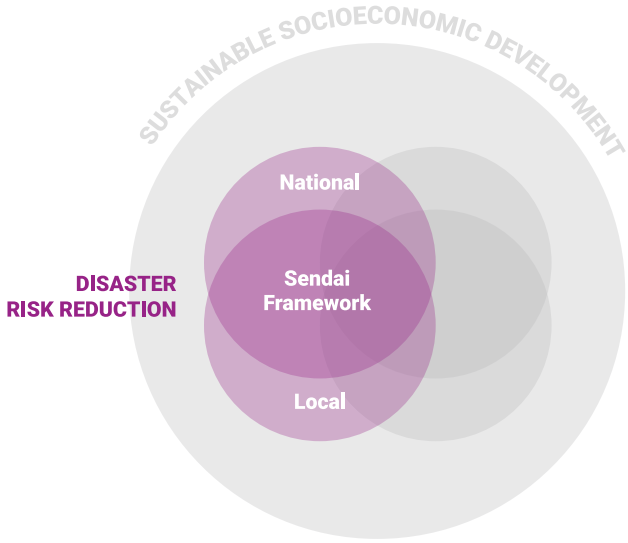
The importance of national and local disaster risk reduction strategies and plans

National and local DRR strategies and plans are essential for implementing and monitoring a country's risk reduction priorities by setting implementation milestones, establishing the key roles and responsibilities of government and non-government actors, and identifying technical and financial resources.[119] While strategies are a central element of a wider disaster risk governance system, to effectively implement policy, these strategies need to be supported by a well-coordinated institutional architecture, legislative mandates, political buy-in of decision makers, and human and financial capacities at all levels of society.

The Sendai Framework does not require countries to develop stand-alone DRR strategies and plans. However, it does ensure they have in place and implement national and local plans that do the job of supporting DRR in alignment with the Sendai Framework. Although there has been debate in the past about the merits of stand-alone or mainstreamed DRR strategies, in practice, this binary notion is not especially helpful in applying the Sendai Framework requirements. Under Priority 2: Strengthening disaster risk governance to manage disaster risk, paragraph 27(a) highlights the need to "mainstream and integrate DRR within and across all sectors and review and promote the coherence and further development, as appropriate, of national and local frameworks of laws, regulations and public policies." Paragraph 27(b) then advises Member States to "adopt and implement national and local DRR strategies and plans, across different timescales, with targets, indicators and time frames, aimed at preventing the creation of risk, the reduction of existing risk and the strengthening of economic, social, health and environmental resilience." Paragraph 27(b) highlights the importance context in defining strategies and plans, and the significance of developing of nationally-determined targets and indicators by 2020. Paragraph 27(a) identifies the fundamental role of strategies and plans in achieving the goal of the Sendai Framework by 2030. This suggests that the precise form that a country chooses to pursue DRR at a strategic level is less important than the content and effectiveness of the strategies and plans in that country context.

In some cases, risk reduction may be integrated into broader national policy planning or sectoral risk management plans and strategies; indeed, this

Figure 11.1. DRR strategies and plans by 2020 aligned with the Sendai Framework and among national and local levels



(Source: UNDRR 2019)

could meet the goal of integrating risk management and development planning. In contexts where awareness of DRR is emerging, stand-alone DRR strategies and plans can be used as an important advocacy tool to sensitize decision makers to take specific actions.[120] But such strategies and plans should have among their objectives the integration of DRR into mid- and long-term planning processes, including climate risk management where these areas overlap.

In many country contexts, stand-alone DRR strategies and plans are needed because their objectives are not automatically addressed through national development or sectoral policy frameworks, or even within the systems established to manage disaster risk, many of which have traditionally focused attention and resources on response.[121] This is often, though not necessarily, the case in countries with lower governance capacity where DRR strategies and plans compensate for risk management gaps in development or sectoral policies.

Clearly it is easier to point to and assess a single strategy, but this can also be in the form of a framework for integrated risk governance across sectors and ministries, addressing climate resilience and risk-informed socioeconomic development. In line with the Sendai Framework and 2030 Agenda, either mainstreamed or stand-alone risk reduction strategies should extend beyond the systems of civil protection or DRM and also include elements that are highly cross-sectoral in nature, such as urban risk management, land-use planning, river basin management, financial protection, public investment resilience regulations, preparedness and early warning, which cannot be addressed comprehensively through any individual sectoral strategy or plan.

119 (UNISDR 2015e)
120 (UNDP 2019o)
121 (IFRC and UNDP 2014b); (IFRC and UNDP 2014a)

DRR strategies, whether stand-alone, mainstreamed or a combination of both approaches, may also have a role in tempering market mechanisms, requiring public policy to address issues related to DRR as a "public good". Public goods are under-provided by the market, are non-excludable and create externalities.[122] For example, individuals and communities may not construct sufficiently robust levees if they do not consider that their flood protection could help others, instead constructing levees that protect themselves only, which may even have a negative impact on those who live outside the embankments.[123]

Having in place **subnational and local DRR strategies or plans** that complement the national policy framework has been increasingly recognized over the past two decades as an important requirement of a functioning risk governance system. The implementation of national DRR strategies hinges on the ability to translate and adapt the national priorities to local realities and needs. Local strategies or plans then allow for a much more nuanced territorial approach (local, subnational and national) that fosters accountability through direct engagement with a range of stakeholders who need to be involved to avoid creating new risk, to reduce risk behaviours or to have a voice as the main groups suffering the impacts of disaster events.[124] The penetration of DRR strategies or plans down to the local level is likely to depend on the level of practical decentralization, while the formal structure of government – centralized or federal – may or may not be a critical factor depending on the country context.[125] As risk is not confined to any territorial or political division, it is also critical that DRR strategies or plans consider transboundary and regional solutions, such as basin- or ecosystems-based management, or arrangements that comprise multiple local government territories.

11.3

Aligning strategies and plans with the Sendai Framework

The Sendai Framework calls on national and local governments to adopt and implement these strategies and plans, across different timescales, and to include targets, indicators and time frames. They should aim to prevent the creation of risk, reduce existing risk and strengthen economic, social, health and environmental resilience. Importantly, Target E has also been reflected in two SDG indicators: (a) number of countries that adopt and implement national DRR strategies in line with the Sendai Framework and (b) proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies.[126]

The Sendai Framework suggests several requirements to be covered by DRR strategies, and these have been distilled into 10 criteria for monitoring (Box 11.1).

It is assumed that DRR strategies and plans that meet all 10 requirements will create the best conditions to substantially reduce disaster risk and losses in lives, livelihoods, health, economic, physical, social, cultural and environmental assets. While all 10 criteria are important, a few stand out in terms of what is considered "new" about the Sendai Framework and its contribution to the global DRR policy agenda. These include a stronger focus on preventing the creation and accumulation of new risk, reducing existing risk, building the resilience of sectors, recovery, building back better and promoting policy coherence with SDGs and the Paris Agreement.

Policy coherence requires that national and local plans are aligned and designed for the context of the society and environment as defined by relevant hazards, high-priority risks and socioeconomic

Box 11.1. Drawing from the Sendai Framework, the following 10 key elements should be covered by DRR strategies to be considered in alignment with the Sendai Framework

i. Have different timescales, with targets, indicators and time frames

ii. Have aims at preventing the creation of risk

iii. Have aims at reducing existing risk

iv. Have aims at strengthening economic, social, health and environmental resilience

v. Address the recommendations of Priority 1, Understanding disaster risk: Based on risk knowledge and assessments to identify risks at the local and national levels of the technical, financial and administrative DRM capacity

vi. Address the recommendations of Priority 2, Strengthening disaster risk governance to manage disaster risk: Mainstream and integrate DRR within and across all sectors with defining roles and responsibilities

vii. Address the recommendations of Priority 3, Investing in DRR for resilience: Guide to allocation of the necessary resources at all levels of administration for the development and the implementation of DRR strategies in all relevant sectors

viii. Address the recommendations of Priority 4, Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction: Strengthen disaster preparedness for response and integrate DRR response preparedness and development measures to make nations and communities resilient to disasters

ix. Promote policy coherence relevant to DRR such as sustainable development, poverty eradication and climate change, notably with SDGs and the Paris Agreement

x. Have mechanisms to follow-up, periodically assess and publicly report on progress.

(Source: UNDRR 2018)

setting. Hence, the selection of risk reduction targets and the balance of different types of measures will be situation specific and will also depend on the risk perception and risk tolerance of the society represented by decision makers.[127] However, making a mere reference to other relevant policies and strategies is not sufficient to meet this requirement. Done in earnest, establishing policy coherence depends on identifying common actions and instruments in support of shared policy objectives to reduce disaster risk or vulnerabilities, or to build resilience.

The 10 criteria recommended for assessing DRR strategies and plans against the Sendai Framework requirements are intended to ensure some consistency. But when the strategies or plans that have been endorsed since 2015 are compared, it is apparent that there is no "one size fits all". Depending on the national or local country context, DRR

122 (Wilkinson, Steller and Bretton 2019); (Dianat et al. 2019)
123 (Wilkinson, Steller and Bretton 2019)
124 (Quental Coutinho, Henrique and Lucena 2019)
125 (Wilkinson et al. 2014)
126 (United Nations General Assembly 2017c)
127 (UNISDR 2017d)

strategies can take a range of formats. Some countries pursue them as stand-alone DRR strategies, and others take the route of a system of strategies across sectors linked by an overarching document or framework. There is also a wide range of different strategic and hazard- or sector-specific plans in place, for example:

- In Norway, the National Disaster Risk Reduction Strategy is outlined in the Civil Protection and Emergency Planning White Paper[128]
- In the Russian Federation, the National Disaster Risk Reduction Strategy forms part of the national security strategy[129]
- In Luxembourg, which does not have a separate national strategy, DRR strategies are in place in specific sectors, as part of one or more combined strategies, such as with respect to flood risk management[130]
- In Kenya, the National Disaster Risk Management Policy[131] is complemented by the Kenya Vision 2030 Sector Plan for Drought Risk Management and Ending Drought Emergencies[132]
- In Angola, a twofold approach is adopted with a Strategic National Plan for Prevention and Disaster Risk Management, covering three of the Sendai Framework's global priorities, and a National Preparedness, Contingency, Response and Recovery Plan, which covers the Sendai Framework's fourth global priority
- In Costa Rica, it was decided to align to the Sendai Framework through the adoption of a National Risk Management Policy 2016–2030 that provides a broad multisectoral mandate and is complemented by five-year National Risk Management Plans

The titles that countries select for their Sendai Framework aligned DRR strategies or plans can be revealing. While in some instances these may indicate context specificity and national priority, taken together they suggest greater similarity and convergence as compared with their predecessors under the HFA. For example: Master Plan for Disaster Risk Reduction (Mozambique); Joint Action Plan on Climate Change and Disaster Risk Reduction (Tonga); National DRM Plan or Strategy (Argentina, Colombia, Georgia, Madagascar and Thailand); Action Plan on Disaster Risk Reduction (Myanmar); National Disaster Risk Management Framework (Zimbabwe); or National Strategy for Disaster Prevention, Response and Mitigation (Viet Nam). HFA equivalents often used language related to civil protection, preparedness and emergency management even though they addressed elements of DRR – Burkina Faso, Canada, Dominican Republic, Kyrgyzstan and Mali for example. Consequently, the title of the policy, strategy or plan may not be a true indicator of the degree to which disaster or climate risk reduction are addressed.

11.4

Lessons learned from the Hyogo Framework for Action and Sendai Framework

While the Sendai Framework monitoring requirements for Target E set high standards for assessing compliance, there are also other criteria that viable DRR strategies or plans need to meet to achieve results. These observations are derived from country-level experiences, mostly during the HFA implementation period, since such information on recently endorsed strategies under the Sendai Framework is not yet available.

Country experience suggests that there needs to be room for flexibility to adjust, evolve and adapt to changing contexts and priorities for strategies or plans to remain relevant and implementable. Hence, regular revisions and updates are strongly recommended. In particular, this relates to the activity level, where real-world changes need to be

reflected, such as in the case of making the switch from printed hazard maps to online information systems, as in Tajikistan.[133] In addition, implementation needs to be supported by financial and technical resources, and operational guidelines and tools that are commensurate with the available capacities and skills of those involved.

Implementation also benefits from having subnational and local strategies or plans in place that are linked with national DRR and development policy priorities. Good examples of this practice are known in India, Indonesia and Mozambique.[134] Implementation plans at different scales of governance can be either stand-alone, as in Bangladesh or Sri Lanka, or they can be integrated into local development plans as in Kenya.[135] In some instances, countries pursue a hybrid solution where subnational DRR plans exist in parallel with local development plans that integrate risk considerations, as the below case study from Mozambique shows.

With regard to the process of drafting or developing DRR strategies or plans, there are now increasing calls for them to be grounded in a comprehensive "theory of change" that allows for a better understanding about how beneficial, long-term change happens. This means that strategies and plans are produced through a process of reflection and dialogue among stakeholders, through which ideas about change are discussed alongside underlying assumptions of how and why change might happen as an outcome of different initiatives.[136]

The involvement of multiple stakeholders is already a key principle of the Sendai Framework, and essential when it comes to seeking agreement on and setting the DRR priorities at different levels of government. Ensuring active participation of women, persons with disabilities, youth and other groups who may not automatically have a seat at the table is a prerequisite for ensuring that their needs are addressed, and their specific knowledge and skills accessed. Calls for the recognition of the right to participate in DRM decision-making, in line with the right to self-determination and access to information, are becoming more frequent.[137] This will also require an understanding of the incentives, interests, institutions and power relations facing key stakeholders engaged in risk-reducing and risk-creating behaviours. Hence, understanding the political economy of DRR will be an essential step for insuring the involvement of all interest groups.

Ariel view of Bhutan
(Source: Curt Carnemark/World Bank)

128 (UNISDR 2017b)
129 (UNISDR 2017b)
130 (UNISDR 2017b)
131 (Kenya 2009); (Kenya 2018)
132 (Kenya 2013)
133 (UNDP 2019l)
134 (Chakrabarti 2019); (Djalante et al. 2017); (Daly et al. 2019); (UNDP 2019g)
135 (Bangladesh, Ministry of Disaster Management and Relief 2017); (Sri Lanka, Disaster Management Centre, Ministry of Disaster Management 2017); (Omoyo Nyandiko and Omondi Rakama 2019)
136 (Twigg 2015); (Wilkinson et al. 2017)
137 (IFRC and UNDP 2014b); (Sands 2019)

11.5

Good practices at national and local levels

11.5.1

Triggers to review or develop strategies

The most obvious impulse for countries to develop or revise their existing DRR strategies or plans is Target E. For example, Costa Rica, Montenegro and Sudan assessed their current strategies and concluded that they were out-dated and did not meet the requirements of the Sendai Framework and other international conventions.[138] Kyrgyzstan and Madagascar identified the need for a new strategy that was able to better address changes in the internal and external environments, meet the principles of sustainable development and be part of the national development strategy.[139] A working group was established within the National Platform, which led the drafting process of the strategy and implementation plan in 2016–2017, which was then approved in January 2018.[140]

In Kyrgyzstan, parliamentarians and heads of the Ministry of Emergency Situations and other State bodies participated in the Sendai conference in 2015. This was the impetus for the Government of Kyrgyzstan to instruct the Ministry of Emergency Situations and other State institutions to consider ways to implement the Sendai Framework. Having undertaken stakeholder consultations, the Ministry of Emergency Situations and the National Platform for Disaster Risk Reduction submitted a proposal for consideration by the government on the development of a new strategy. During 2016–2017, the National Platform led the drafting of the strategy and an implementation plan; the National Disaster Risk Reduction Strategy was approved in in January 2018.[141]

Another important impulse has been the occurrence of major disaster events and the realization that sustainable development is difficult to achieve in the face of the pervasive damage from disasters.[142] For example, this was the case after the 2016 drought in Mozambique,[143] and the 2017 floods in Chiapas, Mexico.[144] In Argentina, a host of developments following the 2015 floods in Buenos Aires Province paved the way for a DRM policy overhaul in line with the Sendai Framework, with support from the Federal Congress for Disaster Risk Reduction and the National Congress for Disaster Risk Management, the passage of a new DRM law (No. 27287) in 2017 and a national plan in 2018.[145]

Another typical trigger for developing or reviewing DRR strategies or plans can be the enactment of new legislation. This has been the case in the Philippines during the HFA implementation period, where the 2010 Disaster Risk Reduction and Management Act tasked government with developing a comprehensive DRM plan and framework. Also, the new DRM law (2015) in Argentina mandated the elaboration of a National Disaster Risk Reduction Plan.[146] Strategies or plans can have a role in supporting the process of legal reform by providing details for the implementation of new and more ambitious laws. They can also extend the reach of out-dated laws by advancing the focus on DRR or requiring DRR to be integrated into development, as was the case in Nepal until the new Disaster Risk Management Act was endorsed in 2017.[147]

No matter what impels countries to align their strategies with the Sendai Framework, it is important that a self-sustaining process is initiated that can keep stakeholders motivated to keep the strategy alive over an extended period of time. This is particularly important at times of infrequent disasters when the memory of devastating impacts is fading. Periods that are free from major disasters provide the best opportunities to focus efforts on reducing the accumulation of new risks while also tackling existing risks.

11.5.2

Foundations in assessment

Although it appears self-evident that risk analysis precedes priority setting and planning, it appears this is not yet common practice. Resource constraints often lead to short cuts when it comes to analysis; many strategies or plans therefore identify risk and capacity assessments as a key output to be produced. This may be a fair and pragmatic solution, if indeed the assessments are conducted, and their results used to review or refine the original DRR strategy. While the importance of both local and scientific knowledge is usually highlighted in the assessment process, in practice, it appears that scientific knowledge tends to be preferred in formal strategies.[148]

Ongoing infrastructure development in Egypt
(Source: Tejas Patnaik/ UNDRR)

In Europe and Central Asia, risk assessments and disaster loss databases have been identified as essential building blocks for the development and implementation of national and local strategies.[149] Low-risk awareness is one of the main challenges, not only when it comes to setting the right DRR priorities but also in implementing DRR strategies. Having access to risk information is therefore an important first step. Haiti,[150] Mexico,[151] Rwanda[152] and Uganda[153] have made great strides

138 (UNDP 2019d); (UNDP 2019j); (UNDP 2019m)
139 (UNDP 2019f); (Andriamanalinarivo, Falyb and Randriamanalina 2019)
140 (UNDP 2019l)
141 (UNDP 2019f)
142 (Maurizi et al. 2019)
143 (UNDP 2019g)
144 (Maurizi et al. 2019)
145 (Argentina Civil Protection Agency 2019)
146 (Argentina Civil Protection Agency 2019)
147 (IFRC and UNDP 2014b)
148 (Jackson, Witt and McNamara 2019)
149 (UNISDR 2017b)
150 (Bureau de Recherches Géologiques et Minières et al. 2017)
151 (Maurizi et al. 2019)
152 (MIDIMAR 2015)
153 (UNDP 2019p)

in understanding their risk profiles by developing national risk atlases, which provide a comprehensive assessment of existing risks at the national and local level in areas that are highly risk prone. The risk assessments and profiles are updated and expanded and are reportedly informing the ongoing process to align the respective DRR strategies and plans with the Sendai Framework.

In Colombia, the preparation of the National Disaster Risk Reduction Plan 2015–2030 was preceded by the development of a risk management index and a diagnostic of public expenditures for DRM in 2014.[154] Tajikistan is another interesting example of a government making a deliberate effort to take into consideration emerging threats in developing a new strategy. The country's increasing scale of industrialization and mining is expected to create new risks related to hazardous wastes and the growing volume of goods transported by road. These require risk management measurements that the Government of Tajikistan is not sufficiently familiar with. Also, so-called legacy threats from radioactive materials will require greater attention as they are technically complex and often beyond the means of local capacities.[155]

Namibia's National Disaster Risk Management Policy from 2009 was revised in 2017, in line with the Sendai Framework. The subsequent Disaster Risk Management Framework and Action Plan (2017–2021) draws upon the findings and recommendations of a national capacity assessment facilitated by the United Nations system through the Capacity for Disaster Reduction Initiative and the United Nations Disaster Assessment and Coordination. The recommendations of the assessment were endorsed by the National DRM Committee in February 2017. Following the endorsement, a stakeholder consultation process has been rolled out at national and subnational levels to prioritize actions, assign responsibilities, and agree on budgetary and timeline requirements across institutions, sectors and governance levels.[156] Other examples of DRR strategies and plans that were based on comprehensive cross-sectoral capacity assessment, include those of Côte d'Ivoire, Georgia, Ghana, Jordan, Sao Tome and Principe, and Serbia.[157] In Sudan, a SWOT (strength–weaknesses–opportunities–threats) analysis laid the foundation for identifying gaps in the DRR policy framework and emphasized the need for the new strategy to better consider the local risk context.[158]

11.5.3

Engagement with stakeholders

Most plans have been developed through some form of collaborative multisector arrangement. Inter-agency working groups, often linked to a country's National Platform for Disaster Risk Reduction, or inter-agency coordination mechanism, are usually guiding the process with representation from ministries, departments and other interested parties, such as NGOs, local governments, academia and the United Nations, like in Guatemala, Kyrgyzstan, Montenegro and Peru.[159] In Sudan, a dual mechanism of a task force and technical committee provided oversight and strategic guidance.

However, broad engagement is not always a guarantee for success. For example, in Tabasco, Mexico, the Civil Protection Master Plan of 2011 was developed in a participatory process by representatives of all state government ministries under the leadership of the Ministry of Planning. Despite the political will this process had generated the plan was only partially implemented.[160] This indicates that a range of other factors can influence the level of implementation.

There are also countries in which the national DRM authority spearheaded the drafting process, as was the case in Colombia,[161] Costa Rica[162] and Mozambique,[163] by seeking inputs on the draft text through consultations in a subsequent step. The Ministry of Local Affairs and Environment was the driving force for the strategy development in Tunisia.

Case study: Awareness-raising in Tunisia resulted in stronger political commitment towards DRR

In Tunisia, a national debate on DRR started in 2012 thanks to the leadership of the Ministry of Local Affairs and Environment – the national focal point for HFA and the Sendai Framework. To back this debate with all stakeholders, the ministry carried out an analysis on the legal and institutional framework to identify gaps related to DRR. In addition, the ministry set up a database of disaster-related human and asset losses over 30 years (1983–2013).[164] These efforts led to awareness-raising of decision makers about the development challenges emphasized by disaster risks. It also strengthened political support for the elaboration and adoption of a national strategy for DRR and improved coordination of DRR at national and local levels.[165]

Consultations, workshops and sector or focus group meetings are common features to many countries, although little information is available as to the quality of participation and access of various stakeholder groups, especially those who are "most left behind". Some countries, such as Kyrgyzstan, also have a requirement to publish new policy instruments publicly for comments before finalization.[166] Yet again, the ability of some stakeholder groups, especially the most vulnerable, to take part in such a process is questionable. Interestingly, countries in the Commonwealth of Independent States see value in the final strategies, and also appreciate the coordinated process to develop such strategies, building on national risk assessments, taking into account likely climate change scenarios, discussing and agreeing on priorities and making explicit linkages to SDGs.[167]

Apart from the difficulty in ensuring an all-inclusive process that is genuinely a whole-of-government and whole-of-society approach, a real challenge for developing strategies and plans relates to the lack of awareness of decision makers who are involved in the process, and their lack of knowledge of DRR and its links to development. It is therefore advisable to accompany DRR strategy and plan development with training and capacity-development support.

11.5.4

Policy coherence

Overcoming the siloed approaches and duplicative efforts in implementing DRR, climate change and sustainable development stands at the centre of the 2030 Agenda and is also ingrained in the Sendai Framework. In aspiring to tap into synergies among these interconnected policy and practice areas, and to overcome the related competition over resources and power, only a few countries have made good advances on this Sendai Framework requirement.

154 (Colombia 2015)
155 (UNDP 2019l)
156 (Namibia, Office of the Prime Minister, Directorate Disaster Risk Management 2017)
157 (UNDP and UNISDR 2018)
158 (UNDP 2019j)
159 (CONRED 2019); (UNDP 2019f); (UNDP 2019m); (UNISDR 2019c); (United Nations 2014)
160 (Maurizi et al. 2019)
161 (Colombia 2015)
162 (UNDP 2019d)
163 (UNDP 2019g)
164 (UNISDR 2019a)
165 (UNDP 2019o)
166 (UNDP 2019f)
167 (UNISDR 2017b)

Box 11.2. Issues for countries to consider when seeking alignment among DRR and other policy arenas, derived from lessons learned and case studies

- Understanding the similarities and differences among CCA, DRR, development objectives, processes and stakeholders.
- Establishing a common ground regarding rationale, objectives, and methodologies, instruments and terminologies.
- Clarifying the administrative set-up for developing CCA, DRR and development planning and agreement on who leads and participates in which mandate. Integrating parts of the administrative set-up if possible.
- Establishing joint or joined-up monitoring and progress reporting of CCA, DRR and development planning.
- Ensuring that the coherence agenda is also pursued at the subnational and local levels.
- Identifying common action and instruments in support of shared policy objectives to reduce disaster risk.

(Source: UNDRR 2017)

In Montenegro, the main hindrance noted during development and implementation of the strategy was that decision makers and stakeholders did not come with prior knowledge of the fields of DRR, SDGs and climate change, including how these areas interact.[168] A spot check of several Sendai Framework aligned strategies and plans has revealed that this requirement is not, or only superficially, met. As noted in section 10.1, and discussed further in section 13.5, this is not the case in the Pacific region. There, FRDP provides high-level strategic guidance to different stakeholder groups on how to enhance resilience to climate change and disasters, in ways that contribute to and are embedded in sustainable development. Under FRDP, Pacific Island governments are called to provide policy direction, incentivize funding to support implementation of coherence initiatives, ensure cross-sectoral collaboration and take measures to gauge progress.[169] Tonga's Joint National Action Plan (JNAP) on CCA and DRM (2018–2028) is one such example of a coherent approach to resilience building, which is anchored in SDGs and other relevant global and regional policy instruments. This is also highlighted as a national good practice case study in section 13.5.2. A key element of Tonga's second plan, JNAP II, is a strong focus on the development of sectoral, cluster, community and outer island resilience plans that fully integrate climate resilience and practical on-the-ground adaptation, reduction of GHG emissions and DRR.[170] Other countries' DRR strategies and plans, such as those of Vanuatu and Madagascar, also take account of risks related to climate change. Other positive examples of policy integration, between DRR and CCA, are discussed in Chapter 13.

168 (UNDP 2019m)
169 (UNISDR 2017d)
170 (Tonga 2018)
171 (Mozambique 2017)

Case study: Policy coherence in Mozambique's Master Plan for Disaster Risk Reduction 2017–2030

In Mozambique, the Disaster Risk Reduction Master Plan (2017–2030) is aligned with the climate change strategy, as well as with other development policy instruments, which have common mechanisms and indicators have been articulated for the strategies or plans.

Chapter 4 of the plan establishes the National Juridical Context and Public Policies, which articulates linkages with the country's National Development Plan, the National Agenda 2025: Visão Estratégica de Nação, the National Climate Change Mitigation and Adaptation Strategy 2013–2025, as well as the Sustainable Development Objectives.

At the level of actions, the plan presents concrete examples through the development of educational approaches integrating risk reduction and CCA (Action 1.1.3), or the creation of mechanisms for ensuring that all projects and programmes relating to poverty reduction, agriculture and rural development take into account access to water, environmental considerations and contributions to the sustainable use of water (Action 2.3.1) as a way to reinforcing resilience.[171]

Another example of policy integration is Egypt's National Disaster Risk Reduction Strategy, which provides a strong rationale for coherence.

Case study: Policy coherence in Egypt's National Strategy for Disaster Risk Reduction, 2017–2030

National Strategy for Disaster Risk Reduction (NSDRR) Courses for Action identify incorporating DRR into sustainable development policies, particularly the Sustainable Development Strategy: Egypt's Vision 2030, as one of the key focus areas. NSDRR also acknowledges that "disaster risk reduction is better addressed through developing a clearly defined vision as well as specific plans, specializations and tasks and high-level coordination within and across sectors."

The strategy specifically identifies that environment, agriculture, water, energy, housing and infrastructure sectors are more pertinent for incorporating risk considerations due to their high vulnerability to disasters and underscores the need for the government to work to mitigate the risks arising from them.

Additional research may be required to identify the specific factors that helped drive the policy alignment process in some countries. The global and regional policy agenda is certainly a supporting factor, as discussed in Chapters 1 and 10. It would also be useful to better understand the role of champions, political developments, administrative reforms, or the allocation of financing and the extent to which they foster or hinder coherence.

11.5.5

Overcoming challenges in implementation

Many countries are faced with challenges when it comes to implementation of their DRR strategies or plans. The reasons are manifold.[172] Some DRR strategies or plans are too general to guide concrete actions. Means of implementation, such as budgets, institutional arrangements, guidelines protocols and multisectoral agreements are not defined, or left for further development after the strategies' approval.[173] In other cases, strategies are too ambitious and not aligned with existing capacities. Weak managerial capacity for DRR, and low awareness of stakeholders involved in implementation are the most common causes.[174] As a result, strategies are not implemented, or only partially so. Therefore, Sudan proactively developed standard operating procedures and a DRR training manual that were adopted by government. Awareness-raising campaigns were also conducted at the federal and state levels, which helped foster trust, understanding and ownership among involved stakeholders.[175] Such measures are essential, especially in contexts of insecurity, fragility and conflict.

Making Cities Resilient in action in Cilicap, Indonesia
(Source: Tejas Patnaik, UNDRR)

As mentioned above, the limited public and private investment in DRR has been a primary reason for the patchy implementation of DRR strategies. This has been the case during the HFA period, and appears to remain an issue also for Sendai Framework aligned strategies and plans as risk reduction priorities still compete against other government priorities over scarce resources, rather than being seen as enabling sustainable development and stable economic growth. The limited understanding of risk and how it interrelates with development are obvious culprits.[176] But also, powerful disincentives in countries' risk governance systems hinder prioritizing risk reduction. In Indonesia, for example, local governments rely on the national disaster fund and are reluctant to use their provincial budgets for the implementation of DRM.[177] Other countries have established similar funds, such as the Mexican Federal Fund for the Prevention of Natural Disasters, providing a dedicated funding source for disaster prevention and a tool to central government to co-finance disaster prevention. The Fund Against the Effects of Natural Disaster in Morocco, under the auspices of the Ministry of the Interior,

is another dedicated tool to finance risk reduction through the State budget. They are usually referred to as being successful in broadening public finance for risk reduction but may carry the danger of over-reliance on these central funds at the expense of co-financing from subnational and sector budgets; noting that the former are usually more constrained than the more affluent sector budgets.

In Tajikistan, the lessons related to the lack of funding for implementing the country's 2010–2015 DRR strategy led to a phased approach in which three-year plans are to be developed that underpin the new 2018–2030 strategy. In this process, the first year would identify funded and already ongoing actions. The second year would define actions and funding requirements for the following year, and so forth.[178]

Recommendations in a recent OECD report focus on the establishment of a financial strategy led by the Ministry of Finance or equivalent to support the implementation of DRR strategies and plans.[179] The report also recommends assessing financial vulnerabilities, conducting comprehensive risk assessments, developing risk transfer markets and carefully managing the financial impacts from disasters. However, it falls short of explicit language that calls on members and partners to ensure that all investment is "risk informed". The issue of public and private investment and disaster risk is critical as this is the "heavy-lifting" of risk reduction, and it is through investment that the public and private sectors either create new risk or reduce risk. Ex ante investments in risk reduction must be carefully weighted when considering the benefits of risk retention and risk transfer.[180]

The World Bank's recent Beyond the Gap report takes the resource discussion to a new level, advocating strongly for a systems approach that combines infrastructure investment and risk reduction as a much more cost-effective means to manage risk, while also reducing risk from climate change.[181] Its key messages include that: low- and middle-income countries can control spending on infrastructure for the same results through improved spending efficiency (with a spending range of between 2% and 8% of GDP); that maintaining infrastructure is central to longer-term efficiency; that with the right policy mix, low- and middle-income countries can achieve the infrastructure-related SDGs with investments of 4.5% of GDP and still be on track to limit climate change to 2°C; and that "infrastructure investment paths compatible with full decarbonization by the end of the century need not cost more than more-polluting alternatives."[182] The message is that risk-informed development is possible for low- and middle-income countries if infrastructure needs, risk reduction, and climate change mitigation and adaptation are all integrated into coherent and system-wide planning and spending policies.

11.5.6

Local-level plans and their implementation

So far, there is little information available on the impact of Sendai Framework aligned strategies in reducing disaster risk on the ground, as most plans have been endorsed only recently, and monitoring and reporting on their implementation are still in progress. However, it has been observed that implementation of national DRR strategies often does not penetrate to the local level. The results of a global survey of local DRR strategies show that among the local governments with DRR strategies, 27.4% have fully implemented the DRR strategies, while most

172 (Omoyo Nyandiko and Omondi Rakama 2019)
173 (Amaratunga et al. 2019)
174 (Subba 2019)
175 (UNDP 2019j)
176 (Subba 2019)
177 (Give2Asia 2018)
178 (UNDP 2019l)
179 (OECD 2017a)
180 (OECD 2017a) (Alton, Mahul and Benson 2017)
181 (Rozenberg and Fay 2019)
182 (Rozenberg and Fay 2019)

of the cities, accounting for 53.4%, have partially implemented their strategy and 19.2% have not yet started the implementation.[183] The reason quoted by 46% of the respondents for incomplete implementation of the strategy was the lack of financial resources, while 22% said it was due to changes in the government and priorities.[184]

Decentralized DRM systems are generally considered more effective than top-down national approaches, which may enhance power structures at the top and draw the focus away from local concerns and initiatives. Decentralized approaches can contribute to inclusive DRM, a more successful identification of people needs, bottom-up planning and empowerment of the local population. It is nevertheless crucial to ensure that DRR remains nationally driven to keep its profile a high priority on the political agenda, ensure countrywide and sectoral coordination, and warrant sufficient allocation of resources where necessary.[185] Having a system of local strategies and plans that can address territorial DRR priorities and that are, at the same time, well aligned with national DRR and development policy and planning frameworks appears to be the most promising approach.

This has been the case in the province of Potenza[186] in Italy, which outlined the #weResilient strategy aimed at pursuing territorial development through a structural combination of environmental sustainability, territorial safety and climate change contrasting policies. It presents a "structural" tool for analysing the needs and driving the choices of over 100 local governments and municipalities with a wide strategic point of view and a multilevel holistic approach.[187] In Vanuatu, the decentralized DRM system was well laid out on paper, with international and local stakeholders working together. However, new NGO actors often found the operational governance system opaque and proper channels elusive. Other factors limiting implementation include the human and physical geography, poor understanding of the causal factors of risk, community disputes and a perceived dependency on aid. It was also noted that while there are bottom-up and top-down approaches to DRM, top-down strategies were more prevalent and that more connection and continuity between the DRR strategies and stakeholders at different levels was needed.[188]

Indonesia's policy of decentralization of 1999 was reflected in the 2007 Disaster Management Law and resulted in the establishment of local disaster management agencies in provinces and districts throughout the country. However, due to gaps in technical knowledge or skills, local government staff struggle to develop DRR plans. Despite receiving training, they are still unclear about what DRR means in practice and how to translate the national policy framework into concrete programmes.[189] But there are also more promising reports of how local-level DRR action plans in Indonesia laid the foundation for the enactment of local DRM legislation, which had a positive effect on increasing financial allocations for DRR.[190]

In Bhutan, district disaster management and contingency plans (DMCPs)[191] were developed in a bottom-up process and then integrated into the national level DMCP, covering around 50% of districts. The district plans were informed by local assessments of hazards, vulnerability and capacity, which were used to generate district-level risk profiles. The plans' disaster reduction priorities address the four priorities for action of the Sendai Framework. An important aspect of the planning process was the identification of the necessary risk governance arrangements, including the identification of key roles and responsibilities and training of a cadre of newly appointed District Disaster Management Officers. In a next step, DMCPs are being integrated into the districts' annual development plans and programmes to muster more support and buy-in for the plans from stakeholders.[192] Linking local DRR strategies or plans with the development planning system appears to be a promising implementation mechanism that has received increasing traction. In Norway, most municipalities have DRR strategies integrated into local development plans with plans being coherent among local, municipal and national levels.[193]

11.5.7

Monitoring

Vague formulations and ambiguous assignment of DRR functions to broad stakeholder groups in DRR strategies can result in overlaps and gaps. This leaves organizations and individuals with an option to withdraw themselves from their responsibilities or to shift them to someone else, making it nearly impossible to hold organizations or individuals accountable for their action or inaction. Even when DRR strategies clearly spell out mandates and roles, the bottleneck may be a lack of awareness or training of stakeholders regarding their roles.[194] Agreement on assigned roles and responsibilities may require some negotiation in cases of competition over roles, or the reluctance to engage in certain functions that are seen to be too complex or less rewarding.[195] To keep strategies at a sufficient strategic level, such detail could be fleshed out in supportive standard operating procedures or similar implementation plans.

When it comes to oversight and reporting on the implementation of DRR strategies and plans, there appears to be a growing number of countries that integrate such a provision. For example, Montenegro specifies an obligation of the Ministry of Interior to regularly report on implemented activities of all institutions involved.[196] The DRR strategy of South Sudan features a dedicated section on Monitoring, Evaluation, Accountability and Learning.[197] In Mozambique, monitoring is part of a national mechanism for the follow-up of the country's multi-year development plan. Other countries that feature some type of mechanism for follow-up include Angola, Colombia, Costa Rica and Vanuatu.[198] However, a spot check of 10 selected plans showed that only 5 featured follow-up mechanisms.

11.6

Conclusions

Governments have many instruments of public policy at their disposal that can be used to influence the risk-generating or risk-reducing behaviour of the general public, the private, public and voluntary sectors. DRR strategies and plans are only one such instrument, laws and regulations, public administration, economic instruments and social services for example, can also determine the creation, accumulation or reduction of risk. Despite the development of such strategies over a span of two decades, it appears that national disaster risk governance systems are often still underdeveloped; this poses potentially a serious constraint on the implementation of the Sendai Framework.[199]

Examination of the contents of strategies and plans reveals considerable gaps, especially regarding the newer elements introduced in the Sendai Framework, such as preventing risk creation, including targets and indicators, and guaranteeing monitoring and follow-up mechanisms. Surprisingly, some of the more established elements are also not consistently addressed in the strategies reviewed, such as clear roles and responsibilities, and methods to devise and deliver local strategies.

183 (Amaratunga et al. 2019)
184 (Amaratunga et al. 2019)
185 (Subba 2019)
186 (Attolico and Smaldone 2019)
187 (Attolico and Smaldone 2019)
188 (Jackson, Wittand McNamara 2019)
189 (Give2Asia 2018, 2)
190 (Daly et al. 2019)
191 (UNDP 2019b)
192 (UNDP 2019b)
193 (UNISDR 2017b)
194 (Planitz 2015)
195 (Wilkinson, Steller and Bretton 2019)
196 (UNDP 2019m)
197 (UNDP 2019k)
198 (Subba 2019)
199 (Subba 2019)

It is nevertheless encouraging to see that there is a growing number of countries which see the value of the process, and are making a greater effort to devise more inclusive and consultative approaches to discuss and agree on their DRR priorities.

At this stage, there is little to report on the level of implementation or impact of Sendai Framework aligned strategies, as many of them have been endorsed only in the last 12–18 months. But there are early indications that the challenges encountered during the HFA decade still apply, despite many good practices and examples. With the 2020 target date fast approaching, and given the role of DRR strategies or plans as key enablers for reducing disaster risk and losses, their development and implementation in line with the Sendai Framework needs to be made an urgent priority at country level.

Chapter 12: Disaster risk reduction integrated in development planning and budgeting

12.1

The importance of integrating disaster risk reduction in development planning

Development can be a major driver of disaster risk, for example when it results in populations and economic assets being located in exposed geographic areas; in the accumulation of risk in urban areas due to rapid and unplanned developments; when it places excessive strains on natural resources and ecosystems; and when it exacerbates social inequalities if the income-generating opportunities for some population groups is curtailed. Therefore, risk should be seen as a normal and inseparable part of economic activities and development, as something built into particular development pathways and practices, constructed through day-to-day decisions by those who have a stake in particular patterns of development. Disaster risk is thus a social construct conditioned by each society's perceptions, needs, demands, decisions and practices.[200]

As presented in previous GARs and reiterated in this edition, it is time to cast off the notion that risk is exogenous to development, something that can be reduced simply by complementing development

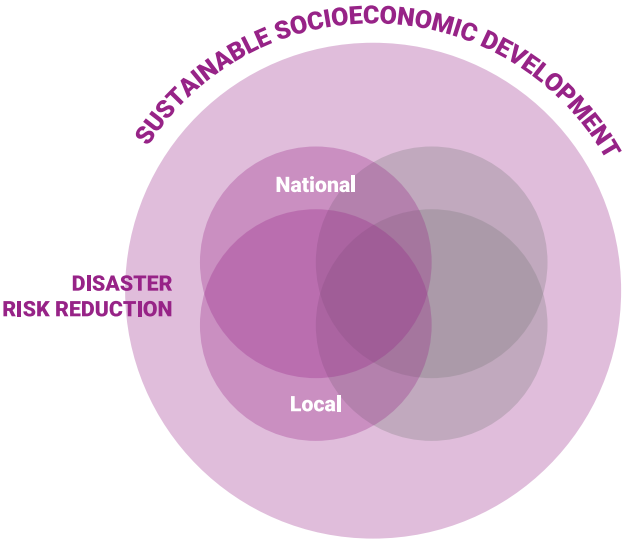
200 (Lavell and Maskrey 2013)

with risk reduction measures.[201] Integrating (also termed mainstreaming) risk reduction must be driven from within key development sectors to ensure that specific sectoral vulnerability can be assessed, and risk management institutionalized in the policymaking, planning, project cycle and investment planning processes. The integration of DRR into development planning and budgeting is therefore predominantly a governance process. It needs to ensure that development is risk informed to improve the safety of people and critical facilities, to protect the natural and built environment, and to build resilient livelihoods and economic activity. Although risk governance is a multi-stakeholder task, governments have an exemplary role as risk avoiders providing public goods and services by refraining from actions that generate risk.[202]

The practical relationship between disaster risk and development therefore provides the core rationale for integrating DRR into development planning and budgeting.[203] However, the need to address the development-based drivers of risk, and the acceptance that disaster risk is a symptom of unsustainable maldevelopment, have yet to fully permeate conventional DRR and development policy and practice.

Avoiding the creation and propagation of risks that occur through flawed development pathways, can best be addressed through prospective and corrective DRM measures; both of which require systems-based approaches to managing risk. Prospective measures to prevent or reduce risk creation can be combined with corrective DRM efforts that reduce the level of existing risk (e.g. through retrofitting of critical infrastructure such as schools or hospitals). Compensatory risk management activities also have a role in strengthening the social and economic resilience of individuals and societies in the face of residual risk (the remaining risk that cannot be effectively eliminated), for example through preparedness, response and recovery activities, contingent credit, insurance and safety net programmes that are designed to help affected populations mitigate disasters or recover from their impacts. The Sendai Framework supports all of these approaches, but as part of a holistic approach, not as a set of alternatives or options.

Figure 12.1. The 2030 Agenda recognizes DRR as central to sustainable development



2

2030 Agenda places DRR as central to sustainable development

(Source: UNDRR 2019)

As risk is increasingly multifaceted, integrating DRR into development planning and practice needs to consider multiple and intersecting threats. Risks associated with natural hazards can manifest in conjunction with man-made hazards, epidemics, conflict or economic shocks for example, which can interact, cascade and amplify impact across sectors, geographies and scales. Pursing integration solely from a DRR angle is therefore unlikely to achieve the targets and indicators of the Sendai Framework and SDGs. There is agreement however that the realization of SDGs will depend on the successful implementation of the Sendai Framework and the Paris Agreement. Success therefore hinges on the ability of decision makers to realize risk-informed development, so driving integrated DRR approaches, different aspects of which can also be described as policy coherence, integrated risk governance and systemic risk reduction.

12.2

The Sendai Framework and integrating disaster risk reduction in development

12.2.1

Scope of the Sendai Framework

Integrating DRR into development planning and budgeting is not a new goal in global policy processes. It was already part of the 1989 resolution on IDNDR,[204] the 1994 Yokohama Strategy and Plan of Action,[205] the 1999 ISDR,[206] and of course HFA.[207] HFA called for reducing underlying risk factors to address disaster risk in sectoral development planning and programmes as well as in post-disaster situations, yet the integration of DRR into policy and legal instruments remained at a nascent stage in most countries by the end of the HFA decade. Even where this had occurred, progress in implementation was limited according to HFA monitor reports.[208]

The Sendai Framework commits Member States to address DRR within the context of sustainable development and poverty eradication, and to integrate DRR into policies, plans, programmes and budgets at all levels. It states that effective DRM, addressing underlying risk drivers through risk-informed public and private investments, contributes to sustainable development. It recognizes the importance of integrating DRR within and across all sectors of development to achieving disaster and climate risk-informed development.[209]

The Sendai Framework highlights several specific entry points that can be pursued to foster the integration of DRR into development. For example, inclusive risk-informed decision-making that is based on the exchange and dissemination of disaggregated data is included under the Sendai Framework principles. Priority for Action 2 recognizes that strengthening disaster risk governance is a means to foster collaboration and partnership across mechanisms and institutions for the implementation of sustainable development. It specifically mentions that integrating DRR into development requires national and local frameworks of laws, regulations and public policies to define roles and responsibilities and to guide the public and private sectors. Priority for Action 3 calls for integrating disaster risk assessments into land-use policy

201 (Lavell and Maskrey 2013); (Aysan and Lavell 2015); (UNDP 2017c)
202 (Wilkinson, Steller and Bretton 2019)
203 (UNDP 2017c)
204 (United Nations General Assembly 1989)
205 (IDNDR 1994)
206 (United Nations General Assembly 1999)
207 (UNISDR 2017d); (Aysan and Lavell 2015)
208 (UNISDR 2013b); (UNISDR 2015c)
209 (United Nations 2015a)

development and implementation, including urban planning, land degradation assessments, and informal and non-permanent housing, as well as into rural development planning and management of various ecosystems. Priority for Action 4 stresses the need to: (a) incorporate DRM into post-disaster recovery and rehabilitation processes; (b) facilitate the link between relief, rehabilitation and development; and (c) use opportunities during the recovery phase to develop capacities that reduce disaster risk, including through land-use planning, improving structural standards and others.[210]

Compared with HFA, the Sendai Framework places a much greater focus on the drivers of disaster risk, such as poverty, climate change, improper land-use planning, environmental degradation, weak building codes and governance, which also undermine sustainable development. However, the calls to curb the creation of new risk through informed development practice and investment that prioritizes long-term risk reduction are what truly sets the Sendai Framework apart from its predecessor. As discussed in section 11.5.5, the World Bank contends that such risk-informed development is possible in low- and middle-income countries – particularly in respect of infrastructure development – through more efficient spending based on system-wide policies.[211]

As elucidated in Part I of this GAR, the Sendai Framework also has a much wider scope in terms of the hazards it covers (natural, man-made, environmental, biological and technological) and the types of disasters (slow and fast-onset, extensive and intensive disasters), while also widening the spectrum of actors it includes.[212] This is intended to facilitate integration of DRR practices into sectors in a way that is more conducive to the systems thinking required for risk and loss to be reduced and resilience strengthened, and mobilize development actors as architects and vehicles of risk reduction. The Sendai Framework thus has the potential to simultaneously transform the risk landscape and facilitate accelerated achievement of the goals and targets of the climate change and SDG agendas.

12.2.2

Disaster risk reporting under the Sustainable Development Goals

Integration post-2015 is not unidirectional. All 46 Member States that presented voluntary national reviews of progress in achieving SDGs at the United Nations HLPF in 2018 included disaster-related information, with many highlighting the importance of implementing different risk reduction measures. These elements are reported differently by different countries. Some focused on identifying hazards, and others described their understanding and effort in implementing the Sendai Framework, relating their work on DRR to a specific SDG.

As discussed in Part II of this report, within the 2030 Agenda, SDGs 1, 11 and 13 include explicit risk reduction indicators for measuring progress in achievement. However, with the scope of Sendai Framework hazards and risks ranging from the biological, to environmental, to technological processes and phenomena, many of the other goals are of relevance.[213]

This is propelling the development of integrated approaches, in implementation, monitoring and reporting. The Philippines and Mexico are harmonizing processes and methods to enable coherent implementation of the Sendai Framework, NUA, the Paris Agreement and the 2030 Agenda at the national level. The Department of the Interior and Local Government of the Philippines is harmonizing risk assessment approaches and planning guidelines of different ministries, to provide clear guidance to local government units on the prioritization of measures and planning that take climate and disaster risks into consideration (e.g. in public building codes). In Mexico, the Ministry of Finance and Public Credit is being supported to develop methodologies and processes for prioritizing the projects that require an in-depth disaster risk analysis, and for integrating risk mitigation and CCA measures into prioritized projects. Additionally, Mexico is integrating the requirements of the Sendai Framework into the National Agenda for Sustainable Development.[214]

12.3

Country experiences with integrating disaster risk reduction into development planning and budgeting

Integrating DRR into development strategies and plans is complex and highly context specific. Countries are pursuing a range of different entry points in their quests to undertake risk-informed development, and there is no single blueprint plan. Instead, learning and sharing from experience, including from other cross-cutting issues, has been of great value. Mainstreaming is a dynamic process that aims to understand risk at the heart of development decisions in policymaking, planning, budgeting, programming, implementation, monitoring and evaluation at national, sectoral and subnational levels, rather than seeing risk management as an add-on.[215] Since development does not follow a linear path, it is important to be sufficiently flexible to seize the opportunity to undertake risk-informed development when and where the political economy is ripe.

DRR mainstreaming at the local and subnational levels encounters similar challenges and constraints as at the national level, but there are often more pronounced gaps in resources and capacities. For local-level mainstreaming efforts to be successful and take root, they are best pursued as part of a wider national undertaking that spans all scales of government administration, several sectors and groups of stakeholders. Joint approaches in mainstreaming of related cross-cutting issues, such as DRR, climate adaptation and gender equality, are also likely to result in more cohesive and effective action.

Experiences with DRR mainstreaming vary considerably among countries with federal or centralized systems, and small or geographically dispersed countries. In many resource-constrained contexts, such as the Pacific Island countries, integrated approaches to DRR and climate adaptation have gained much traction (e.g. in the Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management).[216] Some urge caution, warning of the risk of overburdening already strained capacities.[217] In Fiji, risk reduction was integrated within approaches mainstreaming the already familiar themes of gender and social inclusion. Familiarity with such mainstreaming approaches promoted acceptance of the concept by those involved, who could easily identify the people more affected by climate change and disaster.[218]

Several analyses of DRM and its relationship to development and overall governance suggest that as a general rule the higher the level of development in a country, the greater the progress made in incorporating DRR into development pursuits.[219]

In the following sections of this chapter, country-level experience is examined according to the five entry points for integrating DRR into development planning and budgeting shown in Box 12.1. Although these are presented as separate entry points for analysis, they are, of course, interrelated.

210 (United Nations 2015a)
211 (Rozenberg and Fay 2019)
212 (United Nations 2015a)
213 (UNISDR 2015f)
214 (Steinich 2018)
215 (UNDP 2010)
216 (SPC et al. 2016)
217 (Aysan and Lavell 2015)
218 (UNDP 2019h)
219 (Lassa 2019); (Wilkinson, Steller and Bretton 2019); (Hamdan 2013)

Box 12.1. Entry points for integrating DRR into development

- **Policy and law:** Providing the enabling environment for DRR mainstreaming and achieving risk-informed development. Entry points include: leadership and advocacy; legislation and regulation; policies, strategies and plans; and standards.
- **Organization:** Supporting the implementation of risk-informed policies and plans. Entry points include: coordination and responsibilities for mainstreaming; capacity development; procedures and tools; and programmes and projects.
- **Stakeholders:** Enabling the involvement of critical actors in mainstreaming, such as government, civil society, the private sector, and partnerships and networks.
- **Knowledge:** Driving the mainstreaming process through raising the risk awareness and understanding the links with development. Entry points include: risk assessment; awareness and education; and monitoring and evaluation.
- **Finance:** Providing the essential support for implementation. Entry points include: budgeting and expenditure analysis; public and private sector resource mobilization; risk financing and transfers; and risk-informing investments.

(Source: UNDP 2019o)

12.3.1

Policy and law as an entry point for mainstreaming

Integrating risk into laws, policies and plans is an important conduit for translating political will into concrete risk management actions. The policy entry points are at national, sectoral and local levels, where plans may be conceived through a mix of bottom-up and top-down processes to reflect the needs and capacities of communities exposed to natural hazards. Mainstreaming DRR into development planning requires a systematic effort to assess the risks from and to development, identify DRR measures, apply them to development activities and include them in a strategy document that guides annual planning and budget allocations and public investment instruments.

Legal and regulatory frameworks play a complementary role to plans and strategies as they establish the institutional mandates, the system of accountability for making risk reduction a priority, and budget allocations for implementation. While dedicated DRM laws have been the vehicle of choice for DRR integration so far, there are also efforts being made to integrate risk management in sectoral laws and regulations. The sectors driving economic growth and development in many developing countries (e.g. agriculture, manufacturing and tourism) have a significant influence on the development-based drivers of risk, so the regulatory frameworks that guide these sectors should receive more attention.[220]

Standards are also a form of regulation, either voluntary or compulsory, that are approved for common and repeated use in sectors – these include building codes, standards on electrotechnical equipment, electricity plants and electrically powered utilities, management system standards, codes of best practice on social responsibility, technical standards of professional associations of architects and engineers,[221] and the Sendai Framework minimum standards and metadata for disaster-related data, statistics and analysis.[222] A range of relevant standards developed by the International

Organization for Standardization (ISO) also exist, including Environmental Management Systems (the ISO 14000 family of standards), the new ISO Risk Management Guidelines (ISO 31000:2018) and Societal Security Emergency Management (ISO 22320:2011), which includes risk management as an "integral part of business".[223] There are highly relevant new ISO standards under development under the category of "Sustainable cities and communities", which are close to being launched. Sustainable cities and communities – indicators for resilient cities (ISO 37123)[224] and Sustainable cities and communities – indicators for smart cities (ISO 37122)[225] are the most relevant to urban DRR. These

Flooding in Philippines
(Source: Mathias Eick EU/ECHO)

standards indicate which SDGs they contribute to, and their use will require a high level of policy coherence and integrated implementation.

As sectoral standards are often market driven and developed to respond to requests from industry or consumer groups, governments or regional organizations and administrations, they tend to command a high degree of ownership, which facilitates compliance. Ultimately, political leadership and advocacy to create the political will to reduce risk must go hand in hand with self-regulation – through

220 (IFRC and UNDP 2014b); (IFRC and UNDP 2014a)
221 (Jachia 2014)
222 (UNISDR 2018c)
223 (ISO 2018)
224 (ISO 2019)
225 (ISO 2019)

mechanisms such as standards and community leadership – to drive and eventually absorb the integration approach.[226]

Country experiences

In Kenya, DRR was successfully integrated as a cross-cutting issue to be addressed in nine thematic areas and sectors in the Second and Third Medium Term Development Plans (2013–2017 and 2018–2022). A new National Disaster Risk Management Policy was approved in 2018 – which is currently being translated into an act of parliament – demanding various sectors to integrate DRR into the sectoral planning process at national and subnational levels.[227] The policy was initially championed by the Ministry of Planning, and then taken on by the National Disaster Risk Reduction Platform, which has a wider representation from technical ministries, academia, United Nations agencies and civil society. A key lesson from the Kenya experience has been that high-level political goodwill is a prerequisite for success. The support of the Kenyan President for the Sendai Framework and the involvement of the Parliament and Senate by identifying focus politicians were key factors in the push for legislation.[228]

The five-year National Socio-economic Development Plan VIII (2016–2020) of Viet Nam, and the Philippines Development Plan (2017–2022) consider DRR as a main cross-cutting concern. Such integration will increasingly help to mobilize required financial resources for national and subnational government bodies to implement

Clean up work in Kisumu, Kenya
(Source: Tejas Patnaik /UNDRR)

programmes and projects addressing DRR.[229] In Tunisia, DRR, was for the first time, explicitly introduced in the five-year development plan for 2016–2020 under a chapter on green growth.[230] Indonesia is another example of advanced DRR mainstreaming practice, where the National Development Planning Agency took the lead in integrating DRR into Indonesia's Mid-Term Development Plan 2010–2014, as one of nine development priorities.[231] The national DRM law in Armenia mandates all development processes in the country and all development sectors to integrate disaster risk considerations.[232]

The legal basis for DRR mainstreaming was also a decisive factor in Costa Rica, where the 2005 National Law on Emergencies and Risk Prevention considers DRM as a cross-cutting issue to all development practices, requiring that all institutions must plan and budget for disaster prevention and preparedness. As a consequence, an increasing number of public services in Costa Rica now carry out risk assessments and adopt measures to control risk. To date, 10 public policies related to planning and investment in different sectors (urban, rural and natural resource management) have benefited from DRR mainstreaming. The scope of integration is significant; they include: the National Development Plans for 2014–2018 and 2019–2022; the National Housing and Human Settlements Policy and Plan; the National Policy of Territorial Organization; the National Urban Development Policy; the National Wetlands Policy; the National Health Policy; the National Policy of Adaptation to Climate Change; the National Public Investment Plan; the National Water and Sanitation Policy; and the Risk Management Strategy of the Education Sector.[233] Recognizing that municipalities have a particularly central role in risk management, the Government of Costa Rica also strongly advocates integration of risk management into local planning instruments, rather than developing stand-alone local risk management plans.[234]

Uganda pursued the mainstreaming process through an integrated approach that encompassed DRR and climate adaptation into development planning. Both issues are recognized in the Resilience and Disaster Risk Management Strategic Framework and Investment Program 2015, which will operationalize the country's National Development Plan 2015–2020. DRR and CCA have also been integrated into Uganda's National Building Control Regulations and the National Urban Policy, which reaches over 1.2 million people with its safety measures. In 2018, the National Development Plan was being reviewed to assess the impacts of disasters during its implementation period, which will provide recommendations for the development of the third National Development Plan.[235]

In Mozambique, DRR is considered an integral part of the National Strategy for Climate Change Adaptation and Mitigation (2013–2025), which has 13 strategic actions that are expected to guide adaptation and DRR measures. Subsequent to the national plan, DRR and CCA have been mainstreamed into district planning and budgeting systems in the eight key sectors of agriculture, health, water, social protection, roads, the environment, meteorology and energy.[236] Bosnia and Herzegovina also approached DRR and CCA mainstreaming in an integrated way by making it a mandatory part of the country's strategic planning process through its Law on Development Planning and Management.[237] By using the existing development planning process for DRR integration that built on agreed methodologies and organizational frameworks, the issue is now mainstreamed into 23 local and 8 cantonal development

226 (UNDP 2019o); (La Trobe and Davis 2005)
227 (Kenya 2018)
228 (Omoyo Nyandiko and Omondi Rakama 2019)
229 (Maeda, Shivakoti and Prabhakar 2019)
230 (UNDP 2019o)
231 (Maeda, Shivakoti and Prabhakar 2019)
232 (UNDP 2019a)
233 (Costa Rica, Ministerio de la Presidencia 2019); (Costa Rica n.d.)
234 (UNDP 2019e)
235 (UNDP 2019p)
236 (UNDP 2019g)
237 (UNDP 2019c)

strategies. The standard planning process was complemented by risk assessments and enforced with guidelines on DRR mainstreaming.[238]

Indonesia, the Philippines and the province of Potenza in Italy are also integrating resilience, DRR and CCA concepts into local development and land-use planning.[239] However, experiences are mixed. For example, in Indonesia, the 2007 Disaster Management Law made subnational governments at provincial, district and subdistrict levels responsible for DRR integration into development programmes, requiring them to allocate sufficient funding to do so. Pilot projects on DRR planning were implemented at the community level, which were expected to feed into village level development plans, which were to inform development planning processes at the subdistrict and district level. However, these efforts have had low rates of success due to limited involvement of executive and legislative bodies of district and subdistrict governments, etc.[240] of the sectoral integration of DRR into development may have originated in the education and agriculture sectors. Madagascar has been one of the first countries to have integrated DRR into the education sector. In 2006, a student manual and a teacher's guide on integrating DRR into the school curriculum were developed and are being updated. The Ministry of Education is also committed to strengthening the resilience of the education system and has established a department for DRM within the Directorate of Educational Planning. This has been complemented by capacity-building support for the Heads of the Regional Directorates of National Education.[241]

In a subsequent wave, other key development sectors have been selected for mainstreaming activities such as health, infrastructure, tourism, urban planning and housing. While numerous sectoral mainstreaming tools and guidelines have been developed, aside from the agricultural and infrastructure sectors, very few systematic analyses of the experiences and lessons learned have been carried out.[242] One such study in Southern Africa found that DRR mainstreaming across sectors appears to be generally low, except within climate change policy. Key sectors such as health and education rarely refer to global, regional or national policy frameworks for DRR. Nonetheless, because of the nature of their mandate, health sector policies and strategies in Southern Africa implicitly incorporate risk reduction tools and activities, undertaking risk assessments, prevention activities (for example, for malaria), conducting disease surveillance, early warning and emergency management.[243]

An interesting angle on sectoral mainstreaming has taken root in the agricultural sector in several countries, where complementary planning processes on DRR, climate adaptation and agriculture are being promoted in a three-pronged approach that entails: (a) integrating DRR into agricultural sector plans; (b) designing dedicated DRR plans for the agricultural sector; and (c) prioritizing agricultural risk management practices in national DRR strategies and plans (case study countries included Belize, Cambodia, Democratic People's Republic of Korea, Dominica, Guyana, Jamaica, Lao People's Democratic Republic, Nepal, Paraguay, Philippines, Saint Lucia, Saint Vincent and the Grenadines, Serbia and Zimbabwe).[244] This is exemplified by the Coconut Risk Management and Mitigation Manual for the Pacific Region, and related training. Supported by an integrated planning approach and developed by the Pacific Community and development partners, it takes into account CCA, DRR and business continuity risk management in the production and market dimensions of this key industry for the region.[245]

Space for cross fertilization among different government planning processes on DRR must be created and timelines coordinated to ensure DRR take-up in the different planning documents that have pre-set time frames such as agricultural sector development plans. This highlights how planning for DRR in a sectoral context is not an isolated process; it should link to and complement other sectoral planning processes, such as those related to NAPs, NDCs or similar.[246]

12.3.2

Organization as an entry point for mainstreaming

For DRR mainstreaming to take root, a change in organizational culture is required,[247] as accompanied by the institutionalization of risk management process in the procedures, tools and project management cycle of public and private sector organizations.[248] Examples include risk screening tools for sector planners, or checklists in approval mechanisms that integrate risk. Such measures facilitate the implementation of risk-informed projects and programmes that build disaster and climate resilience. The organizational entry point for integrating DRR into development planning is significantly determined by the organization's broader institutional and governance challenges. Established bureaucratic procedures can be very challenging to reform.[249]

A lack of personnel, expertise and capacity to operationalize DRR mainstreaming has been a bottleneck in many countries, especially when the mainstreaming process moves to the subnational level.[250] It is of paramount importance that staff are aware of their roles and have the commensurate technical and management capacity to conduct their assigned risk management functions and drive the mainstreaming process. To be effective, capacity development needs to move beyond traditional training approaches and support more sustained changes in behaviour.[251] Other stakeholders (e.g. civil society, communities, the private sector and contractors) need to be equipped with mainstreaming know-how, in addition to public planners and sectoral staff.

The interdisciplinary nature of DRR demands that coordination and collaboration arrangements among a wide group of government and non-government stakeholders should be established with roles clarified. National Platforms for Disaster Risk Reduction or National Disaster Risk Reduction Committees should be go-to mechanisms, but have so far been only modestly effective in promoting DRR mainstreaming.[252]

Country experiences

While there are many mainstreaming tools and approaches,[253] mainstreaming DRR effectively into planning processes and project cycles is still a challenge resulting in scattered implementation of DRR measures. However, there is a growing number of countries that have made strides in this direction.

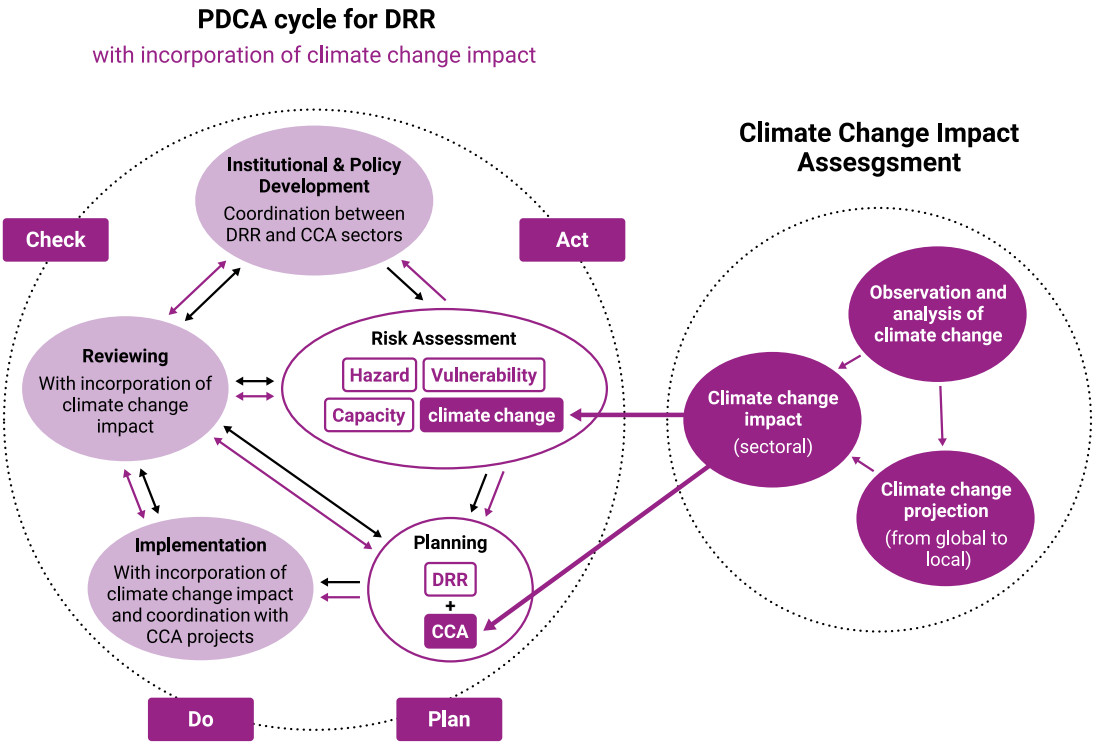
In Ghana, a Guidebook on Integrating Climate Change and Disaster Risk into National Development, Policies and Planning was already developed in 2010. The guidebook suggests a five-step process to integrate CCA and DRR into the planning process at the district level, resulting in projects or programmes now being included within the district composite budgets.[254] Bosnia and Herzegovina pursued DRR mainstreaming through the existing development planning process by way of agreed methodologies and organizational frameworks supported by DRR mainstreaming guidelines.[255]

In the ASEAN region, Member States have agreed on a "plan–do–check–act" (PDCA) cycle for DRR which incorporates climate change impacts consisting of five stages: institutional and policy

238 (UNDP 2019c)
239 (Attolico and Smaldone 2019); (Maeda, Shivakoti and Prabhakar 2019)
240 (Hillman and Sagala 2012)
241 (Maeda, Shivakoti and Prabhakar 2019)
242 (Koloffon and von Loeben 2019); (United Nations Economic Commission for Africa 2015); (UNDP 2018c)
243 (United Nations Economic Commission for Africa 2015)
244 (Koloffon and von Loeben 2019)
245 (SPC Land Resources Division 2018)
246 (Koloffon and von Loeben 2019)
247 (UNDP 2010)
248 (Benson and Twigg 2007)
249 (Lassa 2019); (Hyden, Court and Mease 2003)
250 (UNDP 2010)
251 (UNISDR 2015e)
252 (UNISDR 2013a)
253 (UNDP 2016a)
254 (Nelson et al. 2010)
255 (UNDP 2019c)

development, risk assessment, planning, implementation and reviewing.[256] However, a regional study on risk-informed public investment planning found that there is not yet a sufficient or consistent level of attention to climate and disaster risk information. For example, road sector public investment plans do not yet undergo a systematic environmental or social impact assessment, and cost–benefit analysis does not routinely cover risk scenarios by calculating costs and benefits with or without risk reduction measures.[257]

Figure 12.2. Incorporation of climate change impact in an ASEAN region PDCA cycle for DRR



(Source: Japan International Cooperation Agency 2017)

In Fiji, the Ministry of Rural and Maritime Development formally adopted risk screening into its standard operating procedures, making it an ongoing requirement that eventually helped transform the national public sector investment programme managed by the Ministry of Economy.[258] In Tonga, the Ministry of Finance and National Planning is piloting risk screening of development projects that are funded through the national budget to facilitate systematization of a risk-informed approach throughout government.[259]

A critical aspect of strengthening mainstreaming capacities is to encourage sharing of expertise and learning across actors from different backgrounds through joint analysis of the challenges and the development of context. For example, in Ethiopia, the Africa Climate Change Resilience Alliance has developed a training programme for government and civil society organizations to mainstream DRR and CCA. The initiative focuses on practical learning that can be readily applied, to gradually provide knowledge and skills and bring together a range

of participants with different expertise and from a variety of agencies.[260]

In Uganda, a key starting point for integrated mainstreaming of DRR and adaptation at subdistrict level was sharing good practice among local governments. District DRM committees headed by the Chief District Administrative Officer brought together stakeholders to discuss and understand the potential threats, hazards, disaster-prone areas and identification and mobilization of resources to implement DRR options. The discussions drew on information from Uganda's damage and loss database that has 30 years of historical data. The capacity-development approach was also complemented by training local-level planning officials on the use of risk information in development planning.[261]

In Kenya, the DRR mainstreaming process was initially championed by the Director of Planning, who provided decisive leadership. A systematic training programme on integrating DRR into development planning was implemented through the Ministry of Devolution and Planning. Participants in the training included policymakers, planning officers, DRR focal points from different line ministries, military and police officers, emergency service providers, civil society members, humanitarian workers and interested members of the public. Of particular note is the training of County Development Planning Officers from all 47 counties in Kenya, which was an important enabler of the integration of DRR into the development plans of some counties.[262]

In Indonesia, the National Development Planning Agency offers two-week training for national and local government officials on integrating DRR and climate change concepts into local development plans.[263] Other examples of training at the local level are found in the agricultural sector in Indonesia, Myanmar and the Philippines, where farmers are provided with location-specific weather and rainfall forecasts, and are trained to use this information to increase crop yields.[264]

Establishing DRR focal points in sectoral departments as a vehicle for advancing sectoral mainstreaming has yielded mixed results globally. This has proved successful in a regional programme in the Pacific where full-time senior government posts were established in ministries – such as local government, agriculture, finance and planning, and women's affairs – in Fiji, the Solomon Islands, Tonga and Vanuatu.[265] The posts were important for building in-house capacity to drive and sustain risk-informed development within subnational development planning. They also identified existing and new development projects that were at risk from disaster or climate change, or that could inadvertently drive risk accumulation.[266] In some cases, these posts resulted in new institutional arrangements for resilience, such as the Risk Resilience Unit embedded in Vanuatu's Ministry of Agriculture. Most of these posts were permanently adopted within public service within a period of one to two years. Initial coaching through the regional programme is gradually being replaced by peer to peer networks that enable in-country and regional learning.

The expectation that National Disaster Risk Reduction Platforms would be able to advance the DRR mainstreaming agenda has not materialized as hoped. For instance, a 2013 review showed that more than half of the national platforms surveyed did not address public investment or risk transfer options within their work. Only 35% assisted stakeholders with the integration of risk-sensitive

256 (Maeda et al. 2018); (Japan International Cooperation Agency 2017)
257 (UNDP 2018c)
258 (UNDP 2019h)
259 (Tonga 2018)
260 (Twigg 2015)
261 (UNDP 2019p)
262 (UNDP 2019e); (Omoyo Nyandiko and Omondi Rakama 2019)
263 (Maeda, Shivakoti and Prabhakar 2019)
264 (Maeda, Shivakoti and Prabhakar 2019)
265 (UNDP 2019h); (Tonga 2018); (UNDP 2019i); (UNDP 2019q)
266 (UNDP 2019h); (Tonga 2018); (UNDP 2019i)

analysis of public investment systems and the use of financial mechanisms to reduce or transfer risk.[267] However, there are numerous examples of cross-agency collaboration in DRR mainstreaming. One such example is in Ghana, where the integration of DRR and climate adaptation into district development plans has become a collaborative effort of the Environmental Protection Agency, NDMO and the National Development Planning Commission. The process began with district and local assemblies validating the approach and was followed up by systematic training. Despite such progress, implementation in Ghana has been challenged by limited funding at district level.[268]

Cross-sectoral coordination is also being strengthened in the Philippines where the National Disaster Risk Reduction and Management Council and the Climate Change Commission have a memorandum of understanding for effective cooperation and collaboration.[269] In Viet Nam, the General Department of Disaster Prevention and Control under the Ministry of Agriculture and Rural Development coordinates effectively with other departments in charge of management of flood risks, water resources, agriculture and forestry within the ministry.[270] Yet some national DRM lead agencies – that have long fought for adequate status and resources – find it difficult to "relinquish power and resources" linked to DRR to other departments. This has restricted institutional and organizational change in some countries.[271] Fiji, the Solomon Islands, Tonga and Vanuatu have all recognized that mainstreaming requires: horizontal collaboration – by linking central with sectoral planners across key development sectors; vertical collaboration – by linking national with subnational and community levels; and diagonal collaboration – by linking sectors, including the private sector, with local and community levels.[272]

12.3.3

Knowledge as an entry point for mainstreaming

Knowledge is a critical component of any mainstreaming process. The ability to make a strong case for the link between disaster risk and development and to provide the evidence base for risk-informed development hinges on having access to risk information and knowledge. This entry point also encompasses public education and awareness campaigns to build a common understanding of why mainstreaming is important, and to secure the buy-in of policymakers and other stakeholders to mobilize the resources and capacities needed. In addition, DRR knowledge should be integrated into the curricula of schools, universities, and public and professional training institutes. Formal education and training are key entry points for mainstreaming.

Knowledge related to risk assessment deserves special attention as the foundation for developing a shared vision of what needs to be done. Information on the nature and extent of hazards, vulnerabilities, and the magnitude and likelihood of potential damage and loss needs to expand from single-hazard to multi-risk assessments to capture the range of intersecting threats. For example, addressing desertification and drought risk in Sudan needs solutions that take into consideration the factors that result in heightened competition over land and resources between settled cultivators and nomadic pastoralists.[273]

Integrating risk management into development decision-making and the roles of development actors requires a good appreciation of the wider development context, the political economy and how it supports or hinders DRR.[274] As outlined above, effective mainstreaming of DRR requires a sustained commitment that needs to be nurtured over time. The ability to evaluate the impact of DRR integration through good monitoring and evaluation systems is therefore vital, albeit challenging, because measuring the avoided or reduced risk is not an easy task.[275] Monitoring compliance with legal frameworks, including land-use regulations

and building codes, can provide an insight into how DRR measures can make a difference. However, blurred lines of accountability between the many stakeholders involved often hampers such monitoring and compliance.[276]

Country experiences

In the ASEAN region, most countries have prepared hazard and risk maps for floods, storms and landslides. However, the scale, including topographic data, often does not provide enough information for detailed quantitative risk assessment, land-use planning, evacuation planning and the design of prevention and mitigation measures.

Several countries are integrating climate change impacts when developing risk maps. For example, Indonesia, Malaysia, the Philippines, Singapore and Viet Nam are using climate data downscaled from global climate models for risk mapping and planning for DRR and CCA. However, countries are also struggling to use this type of climate risk information due to the high level of uncertainty of global climate projections and a lack of standardized guidelines for incorporating the information into planning and implementation processes.[277]

Several countries have made impressive progress in the application of risk information in policy and planning processes. The Rwanda National Risk Atlas provides a comprehensive assessment of existing risks at the national and local level across the country's 30 districts.[278] The atlas features sex-disaggregated data on population exposure to risks related to earthquakes, landslides, storms and drought. Since its launch in 2015, the risk atlas has shaped the government's DRR agenda and has contributed to updating the national and district land-use master plans, the Rwanda Building Code and district development plans.[279]

Uganda has also recognized that building a credible risk knowledge base is a driving force for change at policy and local levels. Since 2013, the government has developed hazard, vulnerability and risk profiles for all of the country's 112 districts. Apart from informing public investment decisions and national and local development planning, they also feed into contingency planning and preparedness measures. In 2017, the government further systemized its risk assessment work through the National Disaster Risk and Vulnerability Atlas, which will shape the second National Development Plan. The atlas focuses on seven major hydrometeorological and geological hazards, and is complemented by online and offline data-sharing mechanisms.[280]

Making hazard, land-use and vulnerability data freely accessible to increase awareness of policymakers and citizens alike is a feature of Bosnia and Herzegovina's Multi-Hazard Disaster Risk Analysis System, which maps high-risk areas using a GIS.[281] This risk information has been applied in cost–benefit analysis to help make the economic rationale for public and private sector investment in DRR and to support consideration of alternative interventions.[282] In the ASEAN region, countries have yet to start quantitatively assessing the effects of DRR and CCA measures on economic performance.[283] Countries participating in the Pacific Risk Resilience Programme are conducting risk governance needs assessments, which have been instrumental in

267 (UNISDR 2013a)
268 (UNISDR 2017d)
269 (Maeda et al. 2018)
270 (Maeda et al. 2018)
271 (Aysan and Lavell 2015)
272 (UNDP 2019h); (Tonga 2018); (UNDP 2019i); (UNDP 2019q)
273 (Aysan and Lavell 2015)
274 (UNDP 2019h)
275 (Aysan and Lavell 2015); (World Bank 2017); (Mitchell 2003)
276 (Planitz 2015)
277 (Maeda, Shivakoti and Prabhakar 2019)
278 (MIDIMAR 2015)
279 (UNDP 2017a)
280 (UNDP 2019p)
281 (UNDP 2018a)
282 (UNDP 2019c)
283 (Maeda, Shivakoti and Prabhakar 2019);

aligning the leadership at all levels in support of the respective countries' risk reduction priorities.[284] The programme also conducts risk assessments; these are not pursued as a stand-alone activity, but build on pre-existing community priorities, identifying the risks with the greatest potential impact as priorities for action.[285]

The spatial and temporal complexity of multiple hazards requires sector-specific risk assessments that can consider highly localized extensive risk, as well as a broader range of hazard types to which a particular sector may be exposed. Private utilities are often at the forefront when it comes to risk assessment and taking measures to protect their services. However, the information and know-how are rarely shared with other private or public sector entities.[286]

12.3.4

Stakeholders as an entry point for mainstreaming

Although governments have the primary responsibility to prevent and reduce risk, the Sendai Framework states what is well established, that DRR requires an all-of-society engagement and partnership if it is to be effective.[287] Private sector investment has long surpassed that of the public sector, and with it the greater potential to generate risk.[288] Likewise, actions and decisions at household and community level can contribute to the accumulation of risk, although finding the means to meaningfully involve such stakeholders in risk management can be a hurdle. Government is also made up of a myriad of sectors and departments, interests, powers and knowledge bases that need to be well understood to be effectively deployed in the process. Decision makers, legislators and administrators at national, sectoral and local levels must also set the necessary regulations and exercise their coordination and oversight functions to ensure implementation and compliance. It is critical that governments set the enabling environment and provide incentives for the engagement of other stakeholders in the risk management process. Ultimately, such engagement promotes broader ownership and sustainability of mainstreaming efforts and related DRR measures.

As DRR mainstreaming needs to be driven from within the development sector, the proactive involvement of development actors is needed. Although national disaster management authorities have been indispensable for paving the way and advocating for mainstreaming, most countries have been able to make significant progress only after getting the full engagement of development, planning and finance ministries. This ensures a more holistic approach with explicit linkages to development planning and implementation at all levels. Involving a country's development planning system helps to overcome obstacles linked to horizontal and vertical integration of DRR, as well as mainstreaming DRR more systematically by way of cooperative goal definition, planning and action. This ambition is a long-term, incremental process towards risk-informed development that requires strengthening incentive systems to cooperate with others on shared tasks. Since the role of many traditional DRM institutions is still in need of support, a two-track approach is recommended that also helps consolidate and strengthen the legitimacy and accountability of national DRM authorities or civil protection agencies.

Communities play a key role in terms of their local knowledge, articulating social demands for DRR measures, and ultimately implementing these. Distinct attention must be placed on involving all members that make up a community, including women, youth, older persons, minority and marginalized groups, and persons with disabilities. The mainstreaming process cannot be separated from gender and other social factors that determine vulnerabilities, capacities and exposure to natural hazards. Civil society organizations are indispensable as intermediaries between government and communities, as service deliverers and as activists.

Within the private sector, some companies have been observed to go beyond social responsibility considerations recognizing DRR as a means to ensure competitiveness and business continuity in

the event of a disaster.[289] But the short-term business focus of some companies and sectors still stands in the way of long-term sustainability in DRR. For example, maximizing income at the expense of fragile ecosystems is unfortunately still the norm in many sectors.[290] Many businesses do not consider their exposure to risk, and face losses every year, even in high-income countries.[291] However awareness is growing within governments and business sectors of the need to strengthen disaster and climate resilience of their own businesses and those of their suppliers, including SMEs. This has been notable in South-East Asia, particularly since the 2011 Bangkok floods.[292]

Other key stakeholders include academia and research institutions, as well as the media in terms of its role in fostering awareness, transparency, and influencing decision makers and the wider public, while noting that ill-informed media may also be harmful. Partnerships and networks can be effective in bringing together multiple actors. Their respective comparative advantages, skills, experiences and resources can be pooled, and can help connect sectors and overcome institutional silos.

Country experiences

Lessons from mainstreaming DRR in the agricultural sector emphasize that the process must transcend government boundaries and involve other stakeholders such as academia, NGOs and people at risk such as farmers.[293] In the Solomon Islands, for example, community knowledge hubs were initiated to improve communication between farming communities and government extension workers, thus providing a platform for regular information exchange and training on climate resilience crops.[294]

An interesting example of private sector involvement was pursued in Fiji's Northern Division when one of the first risk-screened capital projects was implemented in the road sector. In addition to addressing the risks to, and from, the road project in each and every phase of the project management cycle, the contractors received targeted risk management instructions to fully understand the rationale behind risk-informed road construction. As this is one of many publicly financed initiatives, over time, this approach is expected to positively affect practice throughout the construction sector.[295]

In the municipalities of Paraná in Brazil, the University Center for Studies and Research on Disasters has promoted the Making Cities Resilient (MCR) Campaign as a means to strengthen risk management capacities. The University Centre has started a network of 23 public and private sector institutions at state, federal and international level, called REDESASTRE. It is the first thematic network officially established in Brazil to promote cooperation and scientific and technological exchange on reducing disaster risk. Thanks to its pluralistic composition, the network has proved a success and a valuable resource to over 80% of municipalities in Paraná seeking to promote resilience in their cities.[296]

284 (UNDP 2017b)
285 (UNDP 2019h)
286 (Sands 2019)
287 (UNISDR 2015e)
288 (UNISDR 2013b)
289 (UNISDR 2015e)
290 (UNISDR 2013b)
291 (Sands 2019)
292 (ADPC 2017b); (Asia Pacific Economic Cooperation Secretariat 2013)
293 (Koloffon and von Loeben 2019)
294 (UNDP 2016b)
295 (UNDP 2019h)
296 (Pinheiro et al. 2019)

Case study: Community-driven mainstreaming in the Ha'apai Islands, Tonga

Water scarcity has been a persistent problem in the Ha'apai Islands, negatively affecting people's health, crop yield and livestock productivity. It was therefore not surprising that community consultations to draw up risk-informed community development plans identified water supply as the top priority. Site selection, safe access to water at night for women, and accessibility of persons with disabilities and older persons were among some of the issues discussed and solutions identified.

The pooling of technical and financial resources from a wide range of partners increased the purchasing power to obtain new water tanks and overcome the logistical challenges of transporting equipment to isolated islands. Drawing upon local volunteers and engineers ensured that capacity to implement and maintain the project was kept local. Low-technology equipment and training of village committees also helped strengthen the communities' technical capacities to cope. As a result of this bottom-up mainstreaming initiative, the Ministry of Finance and National Planning has started to make decisions based on the community needs and priorities outlined in community development plans. The ministry has also started to pilot risk screening of development projects funded through the national budget in a top-down process that contributes to further systematizing the risk-informed approach throughout government.[297]

12.3.5

Finance as an entry point for mainstreaming

The issue of funding needs to be approached with an awareness of the scale of change required to move towards risk-informed sustainable development, and the challenges countries face where resources are scarce and everyday decisions must be made about where to spend precious budget allocations. Many countries report financial constraints as the main barrier to mainstreaming and that these explain the lack of progress in reducing underlying risks nationally and locally.[298] The low level of financing reflects a lack of overall means in many countries, but it also reflects perceptions and priorities of governments and donors on where investment should be made. Historically investment that supports long-term resilience tends to lose out to investment focused on shorter-term goals. Amplifying long-standing arguments that risk reduction is a better public investment than disaster recovery and reconstruction, the World Bank provides evidence – in respect of infrastructure – of how resources can be optimized if spending is undertaken strategically and from a systems perspective.[299]

Financing for prospective DRM can be pursued through development processes such as infrastructure investments through detailed engineering design and planning; this can entail little incremental expense (on average 4.5%), for as long as regulation is strong enough to mandate and monitor these requirements.[300] Strengthening financial mechanisms for DRR remains important. So too, understanding the resources the public sector invests in risk reduction, and the relationship among earmarked budgets and allocations internal to ministerial or agency budgets. The latter is not always straightforward, as risk reduction measures are not always clearly labelled as such, take investment in forestry management in areas exposed to high levels of landslide risk for example.

Having dedicated budget lines for DRR within sectoral budgets is one of the most promising approaches for integrating DRR in national and local budgetary systems. As an intermediate measure, it may be necessary to establish dedicated funds for

DRR, or to allocate a portion of such funds for risk reduction, as is done in the Philippines.

Dedicated funding has yielded good results in some countries, but may also be a disincentive for sectoral ministries and agencies to allocate their own resources, unless it is possible to trace their allocations through budget tagging, as the Philippines is doing for mainstreamed climate change expenditure.[301]

Case study: Risk reduction budget in the Philippines

The Philippine Disaster Risk Reduction and Management Act 2010 (DRRM Act)[302] has detailed provisions on risk reduction budgets:

- Under the DRRM Act, the national budget for DRRM is appropriated under the annual General Appropriations Act, and is known as the National DRRM Fund. The amount must be approved by the President. The DRRM Act specifies that, of the amount appropriated for the National DRRM Fund, 30% is allocated as a Quick Response Fund for relief and recovery and the remaining 70% can be used for broader DRR, preparedness and recovery activities (Act s.22).
- The DRRM Act also requires local governments to establish local DRRM funds by setting aside at least 5% of their revenue from regular sources, to support all types of DRRM activities:
  - Of the Local DRRM Fund, 30% is automatically allocated as a Quick Response Fund for relief and recovery programmes.
  - The remaining 70% can be used for pre-disaster measures. This Local DRRM Fund may also be used to pay premiums on calamity insurance (Act s.21).
- State budget for DRRM also includes the Office of Civil Defense annual budget allocation, provided for in the DRRM Act (s.23).

The Act (s.22) and the Implementing Rules and Regulations also authorize all government agencies to use a portion of their appropriations on DRRM projects in line with the National DRRM Council guidance and in coordination with the Department of Budget (Act s.5, Rule 19).

While not a focus of this GAR, as noted in Chapter 10, risk transfer mechanisms are receiving increasing attention as a means to manage shocks incurred when residual risk is realized – risks that are not, or cannot be reduced through risk management measures, or that may not be cost-effective to reduce further. Access to and deployment of disaster risk financing mechanisms is becoming an increasingly popular option for governments seeking to manage such risk, especially from large

297 (UNDP 2019n)
298 (Aysan and Lavell 2015)
299 (Rozenberg and Fay 2019)
300 (UNDP 2018c)
301 (Alampay et al. 2017)
302 (Philippines 2010a)

and infrequent events.[303] Such mechanisms are made increasingly available through international and regional mechanisms, including a range of tailored insurance products for sovereign risk; as discussed in Chapter 8 in respect of Sendai Framework Target F on international cooperation, and in Chapter 10 on regional initiatives (see section 10.1).

As elucidated in previous GARs, engineering risk-informed investment by the private sector is arguably the key to effective risk reduction. There is important work to be done on how governments can create incentives to engage and mobilize the private sector more fully in this joint enterprise, for example through the lens of business continuity, or in encouraging risk-reducing behaviour in the capital markets – "green bonds" for climate-resilient investment that are subject to voluntary principles within the capital markets framework,[304] for instance.

The featured case study prior to Part I of this GAR, on SME disaster resilience in the Philippines, illustrates how in recognizing the benefits to efficient operations, the country's major businesses have invested in disaster resilience of supply chains through the Philippine Disaster Resilience Foundation. This mechanism collaborates with the government to provide training on business continuity planning and capacity-building. The increasing use of public–private partnerships to build new infrastructure provides governments the opportunity to steer or incentivise investment that prevents the creation of new risk, thereby enhancing the quality and resilience of the built environment.[305]

Public resource allocation is influenced by competing plans, policies and pressures that are present during the bureaucratic process of preparing budget proposals and the political process of approving them. This calls for careful analysis of the potential to leverage resources to attract private, public and international finance (which is especially relevant for national disaster management authorities, climate services or similar). A shift is required in the determination of what constitutes a "good" investment. Investments that truly pursue the societal sustainability and resilience outcomes of the post-2015 agreements must consider the wider risks emanating from the interaction of human and ecological systems. Especially, as the consequences of failing to do so will have potentially more widespread and less foreseeable impacts, as interactions among social, ecological, economic and political systems intensify.

In summary, governments can choose from a range of financing options that include ex post measures such as tax increases, donor assistance, raising debt and budget reallocation. Other options include risk transfer, contingent financing and reserve funds. The potential of private sector investment in risk reduction has yet to be harnessed. The conversation on how to achieve risk-informed development through more efficient investment of the available resources using a systems-based approach is only just beginning.

Country experiences

Governments are increasingly creating internal mechanisms to ensure public investment in new development is vetted for its risk-reducing or risk-generating impacts. Examples include the Ministries of Finance in Fiji, Peru, Tajikistan, Tonga and Uzbekistan, which have recognized the need to align public investment decisions more closely with a strong understanding of disaster risk and its potential economic impacts.[306] The implementation of public investment rules in Costa Rica, Peru and the Plurinational State of Bolivia are good examples of how mainstreaming can go beyond pure declarations of intent.[307]

In general, budgetary allocations for DRR and CCA are found to be insufficient, and the funding gap between the plans and implementation is increasing. A study on the agricultural sector found that dedicated funding for DRR in agriculture was difficult to obtain, unless this was backed by legislation or mandatory allocations for DRR across sectors. But there are exceptions, such as in the case of Cambodia; in 2017, the national budget indicated a considerable increase of the Ministry of Agriculture's budget for climate adaptation from $23

million to $247 million, which directly contributed to flood control and drought management measures. In the ASEAN region, countries have taken initiatives to establish dedicated disaster funds to finance disaster prevention and climate adaptation. Also, national climate adaptation funds, such as the Indonesia Climate Change Trust Fund and the Philippine People's Survival Fund, have promoted local adaptation and disaster resilience projects in water resources management, land, ecosystems conservation and EWSs.[308]

For subnational financing of DRR, the Government of Viet Nam piloted a mechanism to link DRR and climate adaptation plans to the annual provincial budget process and targets. The approach was rolled out in eight high-risk provinces and reached more than 8,000 people, of whom over 50% were women, and is now being scaled up in more than 1,700 communes.[309] In Cuba, municipalities are integrating DRR into the investment planning process. Every public entity is legally obliged to include actions to reduce risk in its economic planning. The National Civil Defense authority carries out regular inspections, and when DRR is not fully integrated in the local investment planning, a mandatory action plan is recommended for implementation by municipal governments within a certain time frame.[310]

As noted in the Philippines case study above, a mandated funding pool of 5% of local government budget for DRR and management activities in the Philippines has strengthened the capacity of local governments in prevention and mitigation measures.[311] Indonesia also has a sophisticated legal framework that sets out the principles to ensure DRR is factored into national and regional budgets, as part of the overall disaster management funding structure. The complexity of the system means that it is difficult to track and assess the budgeting and funding flows for DRR, and the actual investments in DRR are probably higher as many activities are "embedded" within other sectors and not identified as disaster management/DRR related.[312] However, tracking of public expenditure on DRM is a useful exercise to review how public funds are spent by governments across sectors nationally and/or subnationally, and what was achieved as a result.

A Disaster Risk Management Public Expenditure and Institutional Review conducted by UNDP in Lao People's Democratic Republic, Thailand and Viet Nam found that expenditure in support of DRM appeared to be low in relation to GDP and total budget expenditure in the three countries.[313] However, estimated expenditure on DRM-related activities was higher than that estimated for climate change investments in a similar review on climate change expenditures in Thailand and Viet Nam. Expenditure on DRM-relevant activities was concentrated in a small number of similar ministries and agencies across each of the three countries. These ministries included those responsible for agriculture, irrigation, natural resources, environment and construction. DRM-relevant expenditure that was specifically focused on activities related to DRM policy, community awareness, capacity-building, early warning and research, was very small and usually embedded as components in other projects and investments.

While its ability to support prospective risk management is under-optimized, leveraging the private re/insurance industry and capital markets can afford some degree of fiscal protection in disaster-prone economies. Examples of regional parametric insurance schemes were highlighted in section 10.1, but

303 (Alton, Mahul and Benson 2017)
304 (International Capital Market Association 2019)
305 (World Bank 2018)
306 (UNDP 2019h); (UNISDR 2017d)
307 (Bolivia (Plurinational State of) 2015); (UNDP 2019d); (Peru, Office of the Director-General of Public Investment, Ministry of Economics and Finance 2016)
308 (Maeda, Shivakoti and Prabhakar 2019)
309 (Digregorio and Teufers 2019)
310 (UNDP 2017a)
311 (Maeda, Shivakoti and Prabhakar 2019); (Philippines 2010)
312 (IFRC 2016a)
313 (Lavell et al. n.d.); (Abbott 2018)

national schemes are also emerging. Parametric insurance is a financing tool for governments to transfer their rising climate and disaster risk to the international insurance markets. It allows for fast payouts in the wake of disaster, triggered by agreed parameters, which are correlated with insured damages, financial losses or funding needs.

The introduction of the Turkish Catastrophe Insurance Pool in 2000 has resulted in 47% of dwellings having compulsory earthquake coverage.[314] Other sovereign risk transfer options include Mexico's Catastrophe ("CAT") bonds, which allow the government to transfer a pool of disaster risk to the capital markets.[315]

In the Philippines, the parametric insurance scheme covers 25 provinces. Mexico's committee for response to national disasters and emergencies (CADENA in its Spanish title) has established an agriculture pool that offers more traditional livestock insurance and crop area-linked index insurance. For such financing mechanisms to work effectively, they need to be built on thorough national and regional level risk information. This is also the approach of the Risk Assessment and Financing Program in the South-West Indian Ocean, which is led by the Prime Minister's Office and the Ministry of Finance in Madagascar.[316]

12.4

Conclusions

The clear relationship between risk from natural and man-made hazards and risks to and from development is the core rationale for integrating DRR into development planning and budgeting. Unless nations accelerate their efforts to curb the development-based drivers of risk, sustainable development may not be possible, and certainly not achievable by 2030. However, recognition of the need to address these development-based risk drivers, and to accept that disaster impacts are an indicator of unsustainable development, have yet to permeate conventional DRR and development policy and practice. As described previously in this GAR, especially in Chapter 2, this requires a new understanding of risk in the interactions between the environment and human-made systems, and a shift towards systems-based thinking in risk reduction within mainstream policymaking at practice.

There has been some progress in DRR mainstreaming through a range of entry points such as policy, organizations, knowledge, stakeholder engagement and finance. However, several key challenges remain. The capacities and skills to drive mainstreaming and risk reduction processes over a sufficient length of time are still not adequate. Despite many innovative financing mechanisms and regulatory advancements, bottlenecks persist in financing the effort required to achieve the risk reduction goals that countries have set for themselves, including those enshrined in their global commitments under the Sendai Framework, Paris Agreement, 2030 Agenda and other global frameworks.

Setting the right incentives to engage key stakeholders in a meaningful way, including communities at risk and the private sector, is not a new challenge, but is one that requires genuine action. There are still gaps in generating and making accessible risk information, the related tools that are able to generate disaggregated and geospatial data down to the lowest level of analysis, and also in understanding the vulnerability of human systems to cascading and systemic risk.

314 (UNDP 2018b)
315 (International Capital Market Association 2019)
316 (Andriamanalinarivo, Falyb and Randriamanalina 2019)

Chapter 13: Integration between disaster risk reduction and national climate change adaptation strategies and plans

13.1

Disaster and development risks from climate change

13.1.1

Risk from climate change is profound and urgent responses are needed

Current national commitments to reduce GHG emissions and otherwise mitigate global warming under the Paris Agreement will not contain global warming within 2°C above pre-industrial levels, let alone the preferred containment within 1.5°C. The IPCC SR1.5 projects that, based on Member States' current NDCs, the climate system is heading off track into the territory of 2.9°C to 3.4°C warming.[317] If this happens, it would take future hydrometeorological hazard extremes well outside the known range of current experience and alter the loss and damage equations and fragility curves of almost all known human and natural systems, placing them at unknown levels of risk. This would render current strategies for CCA and DRR, in most countries, virtually obsolete. It also means that it is no longer sufficient to address adaptation in isolation from development planning, and that sustainable socio-economic development, by definition, must include mitigation of global warming.

The IPCC SR1.5 and its Fifth Assessment Report (published in 2014)[318] have also reiterated that

317 (IPCC 2018)
318 (IPCC 2014)

global warming triggers climate change effects that are not linear. This is based on multiple lines of evidence, including on observations already made in recent decades and on the projections of a range of different global climate models about future effects. So even if global warming is contained within the range of 1.5°C to 2°C, there will be very significant health and socioeconomic effects due to increasing average temperatures. In addition, and significantly for understanding and reducing risk, humanity now faces the current reality and the future prospect of more-extreme and much higher frequency "natural" hazards – extremes of cold to heat-waves, longer and more sustained drought, more intense and more frequent storm events, heavier rainfall and more flooding. This means that the line between DRR and CCA, if indeed such a line ever existed, is no longer possible to discern. Climate change is by no means the only source of disaster risk. As the foregoing parts of this GAR have emphasized, risks arise from a range of other natural, environmental, biological and technological hazards and drivers. Climate change is increasing the risk of disaster – amplifying existing risk and creating new risks including the direct consequences of a warming planet – with cascading consequences in the short, medium and long term.

In this sense, CCA can be characterized as essentially a subset of DRR. Climate mitigation can also be understood as a subset of development planning.[319] The main policy implication, within the risk framework of this GAR, is that at a minimum, CCA needs to be integrated with DRR, and that governments need to move to a coherent policy approach that sees both of these risk reduction measures as integral to planning for sustainable development.

This situation has become much clearer since the Sendai Framework was agreed in 2015. There is also no obligation on Member States to divide their policy formulation and implementation according to the scope of different international agreements negotiated along thematic lines. Accordingly, this chapter is an account of a range of country policy practices on integration of CCA and DRR. It also gives some examples of fuller integration into development planning and an exhortation to governments to explore more fully the efficiency and effectiveness benefits of taking a systems-based approach to disaster and climate risk management.

13.1.2

International framework

As part of the processes and mechanisms under the 1992 UNFCCC,[320] the Paris Agreement established a global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change. It seeks to contribute to sustainable development and ensure an adequate adaptation response in the context of the temperature goal referred to in Article 2: "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change." [321]

In the years before the Paris Agreement, during the climate negotiations, and since 2015, there has been considerable debate about the likely differences in impact between warming of 1.5°C and 2°C, focusing on the capacity and scope for adaptation. Since 1990, this debate has included a strong message from the Alliance of Small Island States[322] that containment of warming within 1.5°C was essential for socioeconomic survival of its members, and in many cases their physical existence, due to projected sea-level rise and other climate change impacts.[323]

As the United Nations body for assessing the science related to climate change, IPCC was created in 1988, to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options. Its assessment reports, based on the work of a large network of experts globally, have long been familiar to policymakers in the fields of environmental protection and hydrometeorology.[324] Its work is also now widely recognized as relevant to

policymakers concerned with the broader agendas of development planning and DRR.

The last major synthesis report of the IPCC, the Fifth Assessment Report, was published in 2014,[325] and was informed by research undertaken for the 2012 Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.[326] These remain current and relevant resources. The 2018 IPCC SR1.5 is significant in that it addresses the probable differences in impacts of global warming of 1.5°C compared with 2°C, specifically "in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty."[327] It is a compelling new resource that makes it clear that addressing climate change mitigation and adaptation is an urgent global and national priority for DRR strategies as part of planning for risk-informed socioeconomic development, in particular that containing global warming within 1.5°C will reduce the impacts significantly compared with 2°C warming.[328] Relevant highlights of IPCC SR1.5 are considered here as an essential context for addressing questions of disaster and climate risk at national policy level.

13.1.3

Intergovernmental Panel on Climate Change Special Report 2018 – Global Warming of 1.5°C

The IPCC SR1.5 highlights that the global climate has already changed relative to the pre-industrial period and that these changes have affected organisms and ecosystems, as well as human systems and well-being.[329] Human activities have already caused approximately 1.0°C of global warming above pre-industrial levels, which has led to multiple observed changes including more extreme weather, frequent heat-waves in most land regions, increased frequency and intensity of heavy precipitation events, increased risk of drought in the Mediterranean region, rising sea levels and diminishing Arctic sea ice. If global warming continues at the current rate of 0.2°C per decade, the surface of the planet will warm by 1.5°C above pre-industrial levels between 2030 and 2052, provoking further non-linear change with potentially increasingly systemic consequences.

Future climate-related risks to health, livelihoods, food security, water supply, human security and economic growth depend on the rate, peak and duration of warming, but risks to natural and human systems are expected to be lower at 1.5°C than at 2°C of global warming. Future risks at 1.5°C of global warming will depend on the mitigation pathway and on the possible occurrence of a "transient overshoot" (i.e. if the increase goes above 1.5°C but later returns to the 1.5°C level). The impacts on natural and human systems would be greater if mitigation pathways cause such a temporary overshoot above 1.5°C warming and then return to 1.5°C later in the century, as compared with pathways that stabilize at 1.5°C without an overshoot. That is, it is far preferable to ensure that the increase does not ever exceed 1.5°C warming. This would avoid climate change impacts on sustainable development, and support efforts to eradicate poverty and reduce inequalities, if mitigation and adaptation synergies are maximized while trade-offs are minimized.

Some aspects of climate risk most relevant to adaptation strategies at national level – and which also highlight the urgency of integrating climate change mitigation into all development strategies to avoid these risks eventuating in their more extreme forms – are highlighted in Box 13.1.

319 (Kelman 2015)
320 (UNFCCC 1992)
321 (United Nations 2015b)
322 (Alliance of Small Island States 2019)
323 (Thomas, Schleussner and Kumar 2018)
324 (United Nations General Assembly 1988)
325 (IPCC 2014)
326 (IPCC 2012)
327 (IPCC 2018)
328 (Centre for Science and Environment 2018)
329 (IPCC 2018; summary based on input from Wilfran Moufouma-Okia, IPCC)

Box 13.1. IPCC SR1.5 – key climate risks relevant to national adaptation and risk reduction strategies

Extreme hazard events

- Limiting global warming to 1.5°C would limit risks of increases in heavy precipitation events on a global scale and in several regions, and reduce risks associated with water availability and extreme drought.
- Human exposure to increased flooding is projected to be substantially lower at 1.5°C than at 2°C of global warming, although projected changes create regionally differentiated risks.

Human health

- Every extra bit of warming matters for human health, especially because warming of 1.5°C or higher increases the risk associated with long-lasting or irreversible changes.
- Lower risks are projected at 1.5°C than at 2°C for heat-related morbidity and mortality, and for ozone-related mortality if emissions that lead to ozone formation remain high.
- Urban heat islands often amplify the impacts of heat-waves in cities.
- Risks for some vector-borne diseases, such as malaria and dengue fever, are projected to increase with warming from 1.5°C to 2°C, including potential shifts in their geographic range.

Impacts on ecosystems and species important for human food and livelihoods

- Constraining global warming to 1.5°C, rather than to 2°C and higher, is projected to have many benefits for terrestrial and wetland ecosystems and for the preservation of their services to humans.
- Risks for natural and managed ecosystems are higher on drylands than on humid lands.
- If global warming can be limited to 1.5°C, the impacts on biodiversity and ecosystems and on terrestrial, freshwater and coastal ecosystems are projected to be lower than at 2°C of global warming.
- Limiting global warming to 1.5°C is projected to reduce risks to marine biodiversity, fisheries and ecosystems, and their functions and services to humans, as illustrated by recent changes to Arctic sea ice and warm-water coral reef ecosystems.
- Risks of local species losses and, consequently, risks of extinction are much less in a 1.5°C versus a 2°C warmer world.

Agriculture and fisheries

- Limiting global warming to 1.5°C, compared with 2°C, is projected to result in smaller net reductions in yields of maize, rice, wheat and potentially other cereal crops, particularly in sub-Saharan Africa, South-East Asia, and Central and South America.
- Reductions in projected food availability are larger at 2°C than at 1.5°C of global warming in the Sahel, Southern Africa, the Mediterranean, Central Europe and the Amazon.
- Fisheries and aquaculture are important to global food security but are already facing increasing risks from ocean warming and acidification. These risks are projected to increase at 1.5°C of global warming and affect key organisms such as fin fish and oysters, especially at low latitudes.

(Source: IPCC SR1.5 2018)

- Small-scale fisheries in tropical regions, which are acutely dependent on habitat provided by coastal ecosystems such as coral reefs, mangroves, seagrass and kelp forests, are expected to face growing risks at 1.5°C of warming because of loss of habitat.

Regional differences in impacts

- Climate models anticipate robust regional climate differences within global warming. For instance, temperature increases in sub-Saharan Africa are projected to be higher than the global mean temperature increase.
- The differences in the risks among regions are also strongly influenced by local socio-economic conditions. Depending on future socioeconomic conditions, limiting global warming to 1.5°C, compared to 2°C, may reduce the proportion of the world's population exposed to a climate-change-induced increase in water stress by up to 50%, although there is considerable variability among regions. Regions with particularly large benefits could include the Mediterranean and the Caribbean. However, socio-economic drivers are expected to have a greater influence on these risks than the changes in climate.

Small islands

- Small islands are projected to experience multiple interrelated risks at 1.5°C of global warming, which will increase with warming of 2°C and higher levels. Climate hazards at 1.5°C are projected to be lower than those at 2°C.
- Long-term risks of coastal flooding and impacts on populations, infrastructure and assets, freshwater stress, and risks across marine ecosystems and critical sectors are projected to increase at 1.5°C compared with present-day levels and increase further at 2°C, limiting adaptation opportunities and increasing loss and damage.
- Impacts associated with sea-level rise and changes to the salinity of coastal groundwater, increased flooding and damage to infrastructure are projected to be critically important in vulnerable environments, such as small islands, low-lying coasts and deltas, at global warming of 1.5°C and 2°C.
- Projections of increased frequency of the most intense storms at 1.5°C and higher warming levels are a significant cause for concern, making adaptation a matter of survival. In the Caribbean islands for instance, extreme weather linked to tropical storms and hurricanes represent one of the largest risks facing nations. Non-economic damages include detrimental health impacts, forced displacement and destruction of cultural heritages.

Economic growth

- Risks to global aggregated economic growth due to climate change impacts are projected to be lower at 1.5°C than at 2°C by the end of this century.
- The largest reductions in economic growth at 2°C compared to 1.5°C of warming are projected for low- and middle-income countries and regions (the African continent, South-East Asia, Brazil, India and Mexico).
- Countries in the tropics and southern hemisphere subtropics are projected to experience the largest impacts on economic growth due to climate change should global warming increase from 1.5°C to 2°C.

In response to the projected climate risks, the range of climate mitigation and adaptation actions that can be deployed in the short run are well known. These include: low-emission technologies, new infrastructure and energy efficiency measures in buildings, industry and transport; transformation of fiscal structures; reallocation of investments and human resources towards low-emission assets; sustainable land and water management; ecosystem restoration; enhancement of adaptive capacities to climate risks and impacts; DRR; research and development; and mobilization of new, traditional and indigenous knowledge.

Strengthening the capacities for climate action of national and subnational authorities, civil society, the private sector, indigenous peoples and local communities can support the implementation of ambitious actions implied by limiting global warming to 1.5°C. International cooperation can provide an enabling environment for this to be achieved in all countries and for all people, in the context of sustainable development.

It is now clear that human health and welfare, national socioeconomic development in most countries globally, and the global systems of food production and trade are likely to be affected negatively by climate change, even if global warming is contained within 1.5°C above pre-industrial levels. The extent and intensity of climatological hazards is also set to increase, leading to more risk of disasters, even under this most favourable scenario. To an extent, the whole discussion of integrated policy approaches is predicated on the belief that global warming will not exceed 2°C. If it does, the risks to all human systems and societies become incalculable based on present knowledge, and are likely to be catastrophic.

In this sense, effective climate change mitigation is now recognized as the foundation for sustainable development, CCA and DRR. However, the focus of this chapter is on integration of CCA and DRR, and the extent to which they can become part of coherent development policy in practice, based on the immediate short-term needs, and on a degree of optimism that global warming will be contained in the medium to long term.

The landscape for broader climate action is becoming increasingly clear. The following requires further exploration for the purposes of national and local risk governance in the context of this GAR: (a) the range of options and mechanisms for CCA, especially in developing economies and the regions most vulnerable to the effects of climate change and (b) whether there are system efficiencies to be gained by integrating CCA and DRR, and ultimately combining all such risks into planning for risk-informed sustainable development.

13.2

Synergies between climate change adaptation and disaster risk reduction

CCA and DRR efforts share the immediate common aim of building resilience of people, economies and natural resources to the impacts of extreme weather and climate change. But IPCC SR1.5 makes it clearer than ever that climate change may lead to changes in risk levels for non-climate hazards, including impacts on food security and human health due to cascading risks from higher temperatures, warmer seas, sea-level rise and others. As already described in the foregoing chapters of this GAR, the Sendai Framework requires policymakers to contemplate disaster risk from a multi-hazard perspective that includes the traditionally recognized natural hazards that lead to disasters, as well as a range of man-made and mixed hazards, especially the newly included environmental, technological and biological hazards and risks,[330] described in Part I of this GAR.

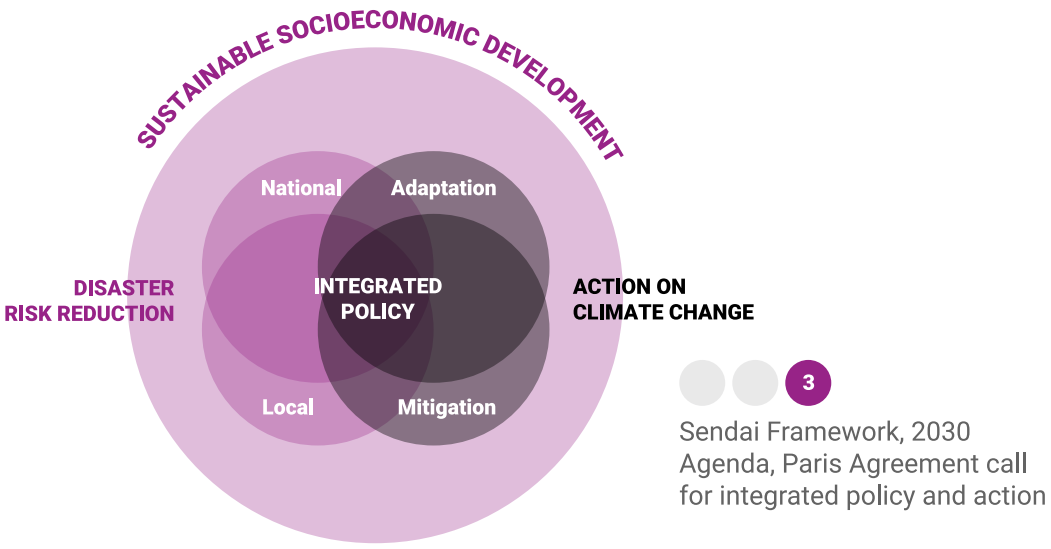
While DRR has a much wider scope than climatological hazards, CCA is also much more related to extreme hydrometeorological hazards and warmer temperatures than DRR. Chapter 2 of this GAR provided significant insights into how multiple risks cascade, and how complex systems generate and respond to shocks in ways that are not linear, making the impacts difficult to predict through traditional hazard-by-hazard monitoring, so that a systems-based approach is needed for effective risk management.

From a policy and governance perspective, climate and disaster risks present a significant degree of uncertainty in estimating potential impacts. This is due to the complex nature of the phenomena, as well as limitations in science and technology to understand projected events and how exposed people and assets will react, due to varied sources and types of vulnerability. However, understanding the commonalities and differences between DRR and CCA in each national context is important for policy coordination, especially if a decision is made to integrate DRR and CCA into one national or local strategy. In some cases, the two are also mainstreamed into risk-informed socioeconomic development planning; it is then essential not to lose sight of the full range of risks that need to be considered, and to include the short-, medium- and long-term timescales required for a systems-based approach.

The question of policy coordination, integration and synergies between CCA and DRR has national and international dimensions. At the national level, governments tend to mandate different departments to deal with the two issues separately, with a few exceptions discussed in the following sections on country experiences. DRR is often assigned to national disaster management agencies, civil protection and response. Given its evolution as an environmental issue, climate change tends to be coordinated through ministries of the environment, in close coordination with finance and planning ministries. Having two departments lead the two agendas separately ensures high cabinet representation, especially in larger countries with more ministries. The downside is that, in some cases, coordination between these activities is limited. The source of financing is also a major factor in the degree of integration of the two issues, with different streams of international financing reinforcing silos at national level due to the funding criteria and compliance requirements.

330 (United Nations 2015a)

Figure 13.1. A systems-based approach to risk reduction: the Sendai Framework, 2030 Agenda and Paris Agreement call for policy integration of development, disaster and climate risk management



(Source: UNDDR 2019)

At the international level, Member States have agreed to different elements in terms of reporting, funding and other mechanisms for their implementation under the Paris Agreement and the Sendai Framework. As at the national level, the two agendas being governed by separate agreements and mechanisms ensure effective international representation. Decisions are in place to promote synergy and coherence in the implementation of the Paris Agreement and the Sendai Framework. The 2030 Agenda provides the common basis for coordinating the implementation of the two, as disasters and climate change have the potential to severely affect development efforts. As discussed in Part II of this GAR, practical coordination for international reporting is in the early stages, and Member States need to address very distinct reporting requirements and funding streams for CCA and DRR. However, new initiatives do exist integrating CCA, climate change mitigation, DRR and sustainable development agendas.

In considering integrated approaches, Member States can also try to avoid some of the perhaps-artificial divisions that occur in international agreements due to the negotiation process and established organizational mandates. For example, one analysis is that the mentions of climate change in the Sendai Framework overemphasizes the hazard dimension of disaster risk, rather emphasizing an all-vulnerabilities and all-resilience approach that includes climate change and development.[331] It may also be helpful in organizing institutional responsibilities at national level to think of CCA as a subset within DRR and climate change mitigation as a subset within sustainable development,[332] even if the choice has been made to establish a separate legal or institutional framework to deal with climate change holistically.

Positive evidence of synergy is already seen in Member States' reports on NDCs under the Paris Agreement. More than 50 countries referenced DRR or DRM as part of their NDC. Colombia and India made explicit references to the Sendai Framework in their NDCs.[333]

13.3

Guidance and mechanisms for integrated climate change adaptation under the United Nations Framework Convention on Climate Change

13.3.1

Evolution of technical guidance on national adaptation plans

At the global level, specific goals and guidance for Member States to conduct CCA comes from UNFCCC, especially the Paris Agreement, as does an increasingly important stream of public international financing for CCA through the UNFCCC financial mechanism, especially the Green Climate Fund (GCF).[334]

UNFCCC has a process to formulate and implement NAPs, which was established in 2010 under the UNFCCC Cancun Adaptation Framework. These types of plans began in 2001 as an initiative only for the least developed countries to formulate NAPAs and thereby access the Least Developed Countries Fund. However, since 2010, there has been a shift to NAPs as a relevant tool for all developed and developing countries.[335] UNFCCC developed initial guidelines for the formulation of NAPs in 2011, which outline four main elements and instruct countries to lay the groundwork and address gaps, develop preparatory elements, establish implementation strategies, and report, monitor and review them on a regular basis.[336]

In 2012, the UNFCCC Least Developed Countries Expert Group developed technical guidelines for the process to formulate and implement NAPs.[337] These are: (a) to reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience, and (b) to facilitate the integration of CCA in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.[338]

DRR is not explicitly mentioned in the initial guidelines for NAPs/NAPAs, and they principally address climate-related hazards, typically drought, floods, sea-level rise and severe storms. However, recent and ongoing efforts by countries to develop NAPs and to undertake broad national and local adaptation planning according to their own needs assessments, provides a clear opportunity for countries to consider multiple risks in development decisions and accelerate the common goal of climate and disaster-resilient development.

Focusing on this opportunity, a supplement to NAP technical guidelines to countries was developed from a disaster risk angle in 2017 specifically dedicated to "promoting synergy with DRR in National Adaptation Plans".[339] In 2018, the UNFCCC Adaptation Committee considered a report from an expert meeting focusing on national adaptation goals/indicators and their relationship with SDGs and the Sendai Framework.[340]

The supplementary guidance aims to provide national authorities in charge of adaptation planning,

331 (Kelman 2015)
332 (Kelman 2015)
333 (UNFCCC 2017)
334 (GCF 2019a)
335 (UNFCCC 2012a)
336 (UNFCCC 2012a)
337 (UNFCCC 2012b)
338 (UNFCCC 2012a)
339 (UNFCCC 2012b)
340 (UNFCCC 2018)

as well as the many actors involved in adaptation, with practical advice on when and how to incorporate DRR aspects in the adaptation planning process. It also aims to give DRM authorities a better understanding of the NAP process, including advice on how they can contribute to and support its development, and to prompt central planning authorities such as ministries of planning and finance on how to use national adaptation planning in shaping resilient development.

13.3.2

Taking the next step – fully integrated development planning

Considering the commonalities in the approaches and requirements of integrating DRR and sustainable resilient development in national CCA strategies such as NAP and NAPA processes, three major actions seem to be most conducive to success. Firstly, establishing a strong governance mechanism that involves all relevant stakeholders across disciplines, which helps avoid ineffective and inefficient action, communication and cooperation. Secondly, developing a central and accessible knowledge management platform and risk assessment system for CCA and DRR with a balanced combination of scientific and local knowledge, good practices, natural and social scientific data, and risk information. And lastly, redesigning funding schemes and mechanisms to support coherent CCA and DRR solutions encourages cooperation and coordination for efficient use of financial resources.[341] The technical expert meeting on adaptation in Bonn, Germany, in 2017 made recommendations to countries to bring DRR and CCA together to ensure sustainable development (Box 13.2).

13.3.3

National Adaptation Plan-Sustainable Development Goals Integrative Framework

To support the formulation of NAPs that integrate well with development planning, the UNFCCC Least Developed Countries Expert Group developed the NAP-SDG Integrative Framework (iFrame) that facilitates integration of different entry points to planning by managing relationships between the entry points and the systems being managed. By focusing on the systems that are key to a country's development, it is possible to map to different drivers (climatic hazards for instance), as well as to sectors or ministries, specific SDGs, different spatial units, development themes or other frameworks such as the Sendai Framework. See Figure 13.2, which shows a sample collection of systems in the middle. These systems become the focus of assessment and subsequent planning and actions to address adaptation goals. The achievement of particular SDGs is ensured by safeguarding that all the necessary systems of governance relevant to that goal are included in the analysis and subsequent action.

NAP-SDG iFrame is being tested in some countries. Early results indicate that this systems approach is effective at focusing on outputs and outcomes that would have the greatest impact on development dividends, while avoiding potential bias introduced when actors promote their interests over those of more essential systems. The approach also helps ensure multiple frameworks are addressed simultaneously. The approach has the potential to manage multiple and overlapping climatic factors or hazards, and should facilitate governance and synergy among different actors and ministries. The systems can be singular, as in the case of nexus approaches, or compound, to represent development themes such as food security, which would invariably include aspects of crop/food production, as well as other aspects of food availability, access and utilization. This approach lends itself to easy design and implementation of integrated models for the system to facilitate assessment of climate impacts and potential losses within a broader development framework. It also becomes easy to assess impacts of one or multiple interacting climatic drivers or hazards, as it is often the case that countries may be faced with multiple hazards in a given year such as serious drought, flooding, shifting seasons and heat-waves.

Box 13.2. Opportunities and options for integrating CCA with SDGs and the Sendai Framework, May 2017

Key recommendations:

- While maintaining the autonomy of each of the post-2015 frameworks, improved coherence of action to implement the three frameworks can save money and time, enhance efficiency and further enable adaptation action.
- Both "resilience" and "ecosystems" can act as core concepts for motivating integration. Actors, including State and non-State, operating across multiple sectors and scales ranging from local to global, can facilitate policy coherence, and vulnerable people and communities can benefit from and initiate effective bottom-up, locally driven solutions that contribute to multiple policy outcomes simultaneously.
- Building the capacity for coherence and coordination will help to clarify roles and responsibilities and to encourage partnerships among a wide range of actors.
- The availability of data, including climate and socioeconomic data, and their resolution remain a challenge, especially in Africa. Better data management, more informed policymaking and capacity-building are needed.
- The process to formulate and implement NAPs can effectively support the implementation of enhanced adaptation action and the development of integrated approaches to adaptation, sustainable development and DRR, thanks in part to its demonstrated success as a planning instrument, the resources available for its support, its iterative nature and flexible, nationally driven format.
- Adequate, sustainable support for adaptation efforts from public, private, international and national sources is crucial. Accessing finance and technology development and transfer and capacity-building support is also critical, particularly for developing countries.

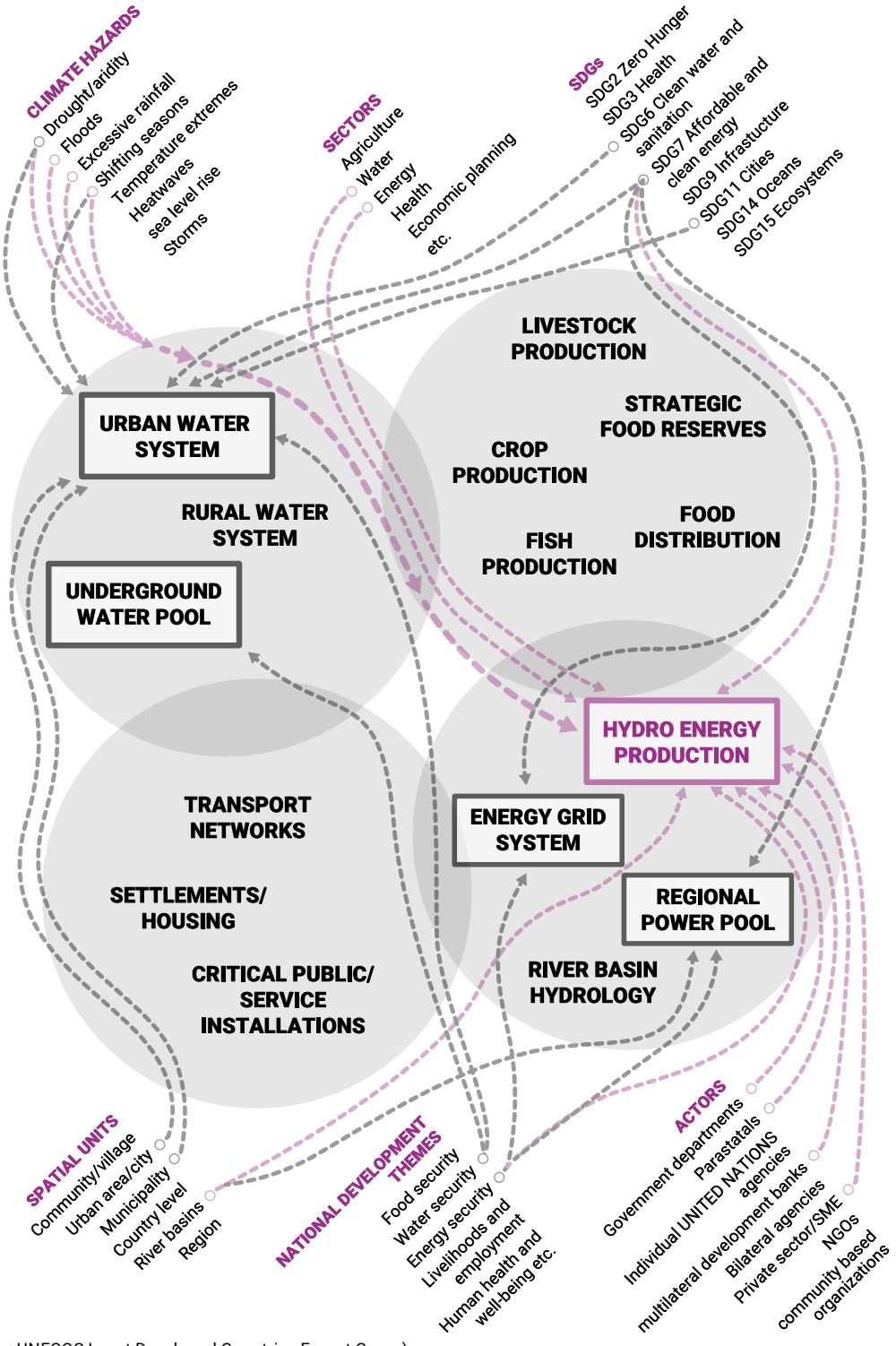
(Source: UNFCCC 2017)

The systems at the centre of the iFrame can be defined in a manner that makes sense for the country, and can include value or supply chains, each with an implied scale and models of drivers and interacting parts, and with specific pathways for how climatic or other natural hazards would have an impact. iFrame can be applied to dissolve working in silos and to manage different lenses to adaptation, and should open up completely new horizons and developments in adaptation planning, implementation, monitoring and assessment, and knowledge management.

The World Bank and GFDRR have also developed a methodology that supports countries to integrate climate change and DRM into development planning. The methodology, that has so far been used in Cameroon, Ghana, Malawi and Senegal, acknowledges that developing countries have limited financial resources and financial planning capacities.[342] It supports governments in the prioritization of their investments by considering existing government-led plans such as national development plans, NAPs, NDCs, etc., and by contributing to highlighting areas and sectors where investments can have the largest

341 (UNISDR 2017a)
342 (De Bettencourt et al. 2013)

Figure 13.2. **Collection of sample national systems showing links to multiple entry point elements including SDGs, as part of NAP-SDG iFrame, being developed by the UNFCCC Least Developed Countries Expert Group**



(Source: UNFCCC Least Developed Countries Expert Group)

impact in building resilience while supporting the country's development objectives. The method relies on an evidence-based participatory and iterative process among national and international climate scientists and economists, sectoral institutions, policymakers and civil society.

In addition to questions of process and financing, the content of DRR and adaptation plans is crucial, as are the mechanisms for their implementation. IPCC SR1.5 does not provide a comprehensive discussion of risk and adaptation options for all natural and human systems due to its scope, but it clearly illustrates key risks and adaptation options for ocean ecosystems and sectors. Adaptation options specific to national contexts, if carefully selected together with enabling conditions, will have benefits for sustainable development and poverty reduction with global warming of 1.5°C, although trade-offs are possible. Most adaptation needs will be lower for global warming of 1.5°C compared to 2°C. There is a wide range of adaptation options that can reduce the risks of climate change, though there are sectoral variations. There are also limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, with associated losses. Furthermore, if the 1.5°C threshold is breached, the possibilities to adapt will diminish as ecosystem services collapse. Unable to support current economic activity and human populations, migration on a scale never before seen may be triggered from arid and semi-arid regions to low elevation coastal zones, building risk.

Many adaptation initiatives are currently occurring at local levels in response to observed and projected environmental changes as well as social and economic stresses. Recent studies have suggested that some of the climate adaptation actions are not sustainable, lack evaluation frameworks and hold potential for maladaptation. Utilizing indigenous and local knowledge and stakeholder engagement can aid the development of adaptation policies and broader sustainable development, along with more proactive and regionally coherent adaptation plans and actions, and regional cooperation. But sometimes the approach needs to take a wider and more systemic view of risk and adaptation. For example, synergies can be achieved across systemic transitions through several overarching adaptation options in rural and urban areas. Investments in health, social security, risk sharing and spreading are cost-effective adaptation measures with high potential for scaling up. Social protection programmes, including cash and in-kind transfers to protect poor and vulnerable households from the impact of economic shocks, natural hazards and other crises, can also build generic adaptive capacity and reduce vulnerability when combined with a comprehensive climate risk management approach.

DRR and education-based adaptation to climate risks are critical for building adaptive capacity, but may have lower prospects for scaling up than some of the more system-wide adaptation approaches mentioned. As a process for designing, implementing and evaluating strategies, policies and measures to improve the understanding of risk, DRR is a tool that can be integrated with adaptation to reduce vulnerability. However, institutional, technical and financial capacity challenges in front-line agencies often constitute constraints.

The following exploration of national and regional practices in integrated approaches to DRR and CCA therefore aims to identify some of the challenges, synergies found in practice and lessons learned from different approaches.

13.4

Selected country experiences with integrated climate and disaster risk reduction

13.4.1

Enabling legislation and institutions

The International Federation of Red Cross and Red Crescent Societies (IFRC), in collaboration with United Nations organizations and donors, has developed tools to support countries to strengthen their legal and policy frameworks for DRR and CCA. The Checklist on Law and Disaster Risk Reduction is a succinct and easy-to-use assessment tool that, by guiding a research and assessment process, helps countries identify strengths in legal frameworks. These are areas where greater focus is needed on implementation, as well as whether drafting or revision of legislation is necessary. Another relevant tool is the Law and Climate Change Toolkit. This is a global electronic resource designed for use by national governments, international organizations and experts engaged in assisting countries to implement national climate change laws.

To establish a strong governance mechanism, strategies benefit from an enabling legal framework which also applies to integrated DRR and CCA strategies. Recent reviews of DRR laws and regulations in various countries indicate that the integration of DRR and CCA into legal frameworks remains the exception rather than the rule.[343] The trend in the countries reviewed has been to allocate responsibility for the administration of CCA laws to ministries of environment, without requiring them to coordinate with DRM institutions, while DRM institutions are also not required to coordinate with Ministries of Environment. Only more recently have some countries, notably in the Pacific but also other regions, adopted a new model in which CCA and DRR are integrated with development planning and resource management legislation.

Examples of such integrated legal frameworks include Algeria, Mexico and Uruguay. In Algeria, the National Agency on Climate Change, based in the Ministry for the Environment, is responsible for mainstreaming CCA into development planning. However, as Algeria's National Committee on Major Risks, established by law, is mandated to coordinate all activities on major risks, including implementation mechanisms for CCA and DRM institutions, it provides an overarching coordination mechanism. The enabling law for this in Algeria is the 2004 Law on Prevention of Major Risks and Disaster Management. This legal and institutional framework has the potential to achieve a high level of CCA and DRR integration if implemented as planned.[344]

In Mexico, the General Climate Change Law of 2012 is supported by a special national climate change programme and an Inter-Ministerial Commission on Climate Change, which is a cross-sectoral coordination body formed by the heads of 14 federal ministries. In Uruguay, a special decree, the National Response to Climate Change and Variability, was passed in 2009. Implemented by the Ministry of Housing, Spatial Planning and the Environment, its purpose is to coordinate actions among all institutions relevant to achieving risk prevention in the whole territory.

13.4.2

Financing

Financing for adaptation and DRR is a key element for enhancing capacity and ensuring successful implementation. Although many countries have undertaken climate and disaster risk assessments, the systematic integration of these assessments into national financial and fiscal planning processes is still limited. This suggests a need to redesign funding schemes and mechanisms to encourage

cooperation and coordination for efficient use of financial resources.

International public financing of CCA is now also a major resource and influence on national approaches. GCF was set up in 2010 by Parties to UNFCCC as part of the Convention's financial mechanism to increase financial flows from developed countries to developing countries for mitigation and adaptation. It implements the financing provisions of the Paris Agreement (especially Article 9) aimed at keeping climate change well below 2°C by promoting low-emission and climate-resilient development, at the same time taking into account the needs of countries that are particularly vulnerable to climate change impacts.[345] It is the most significant source of public international financing for national adaptation planning (through a range of instruments such as grants, concessional debt financing, equity and guarantees), with $5 billion already committed by early 2019 and over 100 country mitigation and/or adaptation projects under way through accredited partners.[346]

Many of the GCF adaptation projects integrate components that would often be seen as DRR or sustainable development. This indicates the extent of policy coherence or integrated risk governance that is already being made possible under this mechanism. Projects are explicitly documented in relation to the SDGs that they help to implement. The criteria include safeguards for indigenous peoples, gender mainstreaming and environmental and social safeguards. For example, a project just commenced in Namibia is on building resilience of communities living in landscapes threatened under climate change through an ecosystems-based adaptation approach (Project SAP006). It serves GCF results areas (health, food and water security; livelihoods of people and communities; and ecosystems and ecosystem services) as well as SDG 13 on climate action; SDG 14 on life below water; and SDG 15 on life on land.[347] In DRR terminology, this project is also about drought resilience. It is hoped that this clear move towards integrated risk governance by GCF will encourage integrated project proposals from countries where disaster and climate risk have significant overlaps, either generally or in specific regions or sectors.

13.4.3

Risk information

An integrated CCA/DRR policy, strategy or plan needs to be complemented by adequate, accessible and understandable risk information. Ideally, this is an available resource during the policy development stage, to help formulate objectives and goals, but joint risk assessments and ongoing information sharing are key elements of integrated strategies.

A study in Vanuatu identified a well-developed DRR operational governance structure comprising many government levels and non-governmental actors working together to implement top-down and bottom-up DRR strategies that contemplate CCA elements. Stakeholders in Vanuatu accept local and scientific risk knowledge to inform DRR policies, although scientific knowledge is still precedent for the development of formal instruments to reduce disaster risk.[348]

Several good practices in the United Kingdom of Great Britain and Northern Ireland have been identified. These include strong support for the assessment of flood and climate risk through the Adaptation Reporting Powers under the Climate Change Act, which encouraged key infrastructure institutions to consider the impacts of hazards such as flood and climate change on their business and the provision of key services. Additionally, the government encourages use of ecosystem-based

343 (IFRC and UNDP 2014b); (Picard 2018)
344 (UNISDR 2013c)
345 (GCF 2019a)
346 (GCF 2019a)
347 (GCF 2019b)
348 (Jackson, Witt and McNamara 2019)

approaches (e.g. sustainable urban drainage) and infrastructure that has the flexibility to be adapted in the future (e.g. the flood defence walls implemented in Morpeth, north-east England, which have been constructed so that they can be modified easily if required in the future).[349]

A Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR) assesses the impacts of climate change on freshwater resources in the Arab region and their implications for socioeconomic and environmental vulnerability. It does so through the application of scientific methods and consultative processes involving communities in CCA and DRR. The initiative prepares an integrated assessment that links climate change impact assessment outputs to inform an integrated vulnerability assessment to climate change impacts, such as changes in temperature, precipitation and run-off, drought or flooding due to shifting rainfall patterns and extreme weather events.[350] The RICCAR example shows that joint assessments and knowledge development involving two otherwise siloed communities of experts can help build a common understanding of risk, which is the precondition for planning and budgeting.

13.4.4

National adaptation plans

Although NAPs are developed by many countries, the focus for UNFCCC monitoring is on developing countries, and it maintains a public database of these, NAP Central. As at 31 March 2019, 13 NAPs from developing country Parties were developed and submitted on NAP Central between 2015 and 2018, namely Brazil, Burkina Faso, Cameroon, Chile, Colombia, Ethiopia, Fiji, Kenya, Saint Lucia, Sri Lanka, State of Palestine, Sudan and Togo.[351] All of these include aspects of DRR, providing scope for increased coherence between DRR and broader adaptation during the implementation of NAPs.

When evaluating the latest developing country examples of NAPs, which seem to have great potential for integration with DRR, a survey was conducted that showcases the following country experiences.

Case study: Rwanda national adaptation plan

Rwanda integrates DRR into its NAP. Its NDC under the Paris Agreement lists early warning and community-based DRR as adaptation measures, and a guiding principle of the National Disaster Management Policy is to mainstream climate change into DRR.

The two thematic areas are managed through the Ministry of Disasters and Refugees, in charge of DRR, and the Ministry of Environment, through the Rwanda Environment Management Authority, in charge of CCA. These institutions are key partners in DRR and CCA, and have adopted a multidisciplinary and multisectoral approach. The National Disaster Management Policy provides that all public institutions in Rwanda should be involved in disaster management, and it allocated necessary resources to ensure that disaster management is fully incorporated and mainstreamed into plans.

Rwanda's vulnerability to disasters and climate change is rooted in the reliance of most of its population on rain-fed subsistence farming practised on steep topography. Given the livelihood dependence on weather conditions, it is critical that climate change is mainstreamed to help guide interventions aimed at reducing vulnerability to potentially adverse impacts. The policy commits to ensuring that climate change is mainstreamed into all activities related to

disaster management using the East African Community regional climate change policy and the Rwanda Green Growth and Climate resilience strategy as a point of reference.

One of the 14 programmes of action in Rwanda's National Green Growth and Climate Resilience Strategy is dedicated to DRR from a health perspective and is entitled Disaster Management and Disease Prevention. The programme enables risk assessments, vulnerability mapping and vector-borne disease surveillance; the establishment of an integrated EWS, and disaster response plans; the incorporation of disaster and disease considerations into land-use, building and infrastructure regulations; and the employment of community-based DRR programmes designed around local environmental and economic conditions, to mobilize local capacity in emergency response and to reduce locally specific hazards.

The example of Rwanda shows that strong political leadership, based on the scientific evidence that livelihoods are affected by disaster risk and climate change, led to the development of a comprehensive governance framework and the integration of DRR and CCA at different policy levels. As climate change and disaster management are classified as cross-cutting issues in the top national economic development documents, all sector plans are required to include interventions for these issues as budget allocation follows the same guidelines. However, the main hindering factor in implementation remains limited human and financial resources, which make it difficult to move from information exchange and coordination to coordinated action.

The Rwanda case illustrates the strong links between disaster and climate risk in an agrarian economy, and the potential for cascading risk to human health, to which it has responded with an integrated approach including multi-hazard risk assessments and institutional partnerships.

The example from the State of Palestine demonstrates a complex interaction among natural hazards, pressures of population growth and agriculture, fragile ecosystems, water scarcity and regional politics, requiring the systems-based approach it has taken towards assessing and managing disaster and climate risks to development.

349 (Clegg et al. 2019)
350 (United Nations Economic and Social Commission for Western Asia 2017)
351 (UNFCCC 2019)

Case study: State of Palestine national adaptation plan

The State of Palestine is highly vulnerable to earthquakes, floods, landslides, drought and desertification, rapidly declining groundwater resources and seawater intrusion. Water shortage is compounded by overexploitation of water resources and transboundary restrictions. Recent drought events and high population growth have added pressure to its capacity to adapt. Pollution and environmental problems are also exacerbated by restrictions in access to and control over natural resources, such as fresh water and agricultural lands, which are key drivers for overgrazing, deforestation, soil erosion, land degradation and desertification. Environmental degradation of the coastal zone and solid waste disposal are becoming serious concerns in the Gaza Strip. These risks adversely affect the economy, society, environment, health and other sectors. After assessing them holistically, the State of Palestine is making a shift from disaster management to risk management following a 2017 Ministerial Decree.

From the climate adaptation angle, the comprehensive assessment for the 2016 NAP identified a wide range of "highly vulnerable" issues in relation to water, agriculture and food that also affect the vulnerability of other sectors.[352] The NAP assessment revealed that the complex political environment has implications on the State of Palestine's adaptive capacities in relation to many sectors, which compound and aggravate climate vulnerabilities. Consultations with the Environmental Quality Authority were then initiated to support the development of strategies for better embedding ecosystem-based DRR and CCA into policies to protect and manage the ecosystem and natural resource base of the country.

Two national committees provide platforms for coordination among government agencies and other actors: the National Platform for Disaster Risk Reduction, chaired by the Prime Minister's Office, and the National Committee for Climate Change, chaired by the Environment Quality Authority, which is also establishing a General Directorate for Climate Change and Disaster Risk Reduction.

The institutional and legal framework of the DRM system has been set by a national team of governmental agencies, advised by an international advisory team, and there is a draft DRM law with the Prime Minister's Office. The DRM framework forms part of the Disaster Management Policy that is included in the 2017–2022 National Policy Agenda. Preparations for a risk analysis study and the development of a national DRM strategy were under way at the time of writing, with plans to develop a risk map during 2019.

Exploring what ecosystem services can contribute to CCA and DRR, the State of Palestine is developing a coherent set of policies, and there is ongoing work to establish units for CCA and DRR in the institutional set-up of the main relevant Palestinian institutions. Progress has been possible due to the existing political will and commitment. CCA, NAPs and the ecosystem–DRR–CCA nexus are well established in national policies, strategies and plans.

Hindering factors are restrictions on the control of natural resources, a lack of financial resources and environmental education, low-level awareness of climate change risk and difficulty in implementation of integrated development programmes, especially in mobile Bedouin Communities. There are also issues of overlapping mandates among different Palestinian institutions, different sources of traditional knowledge and culture, and limited data availability.

Case study: Chad national adaptation plan

The Chadian NAP includes a project on Community-Based Management of Climate Risks in Chad. By 2021, it aims to ensure that farms, fishing communities and small producers, notably youth and women in targeted regions, use sustainable production systems that allow them to meet their needs, bring food to market and adopt a living environment that is more resilient to climate change and other environmental challenges.

As a Sahelian country, Chad suffers the adverse effects of climate change on all areas of activity of the population, particularly in rural communities. In recent years, there have been many extreme events (e.g. floods, drought and wildfires), as well as increasing land degradation. The limited capacity of local populations to adapt to climate risks is the context for the project, which proposes ways to strengthen the capacities of local communities to adapt to climate change, as well as to develop financial mechanisms for adaptation.

The lead institution is the Ministry of Agriculture, which will integrate outcomes into its plans and policies and will influence the debate on climate risk management in Chad. However, the Ministry of Environment, Water and Fisheries, the Ministry of Civil Aviation and National Meteorology, the Directorate for the Fight against Climate Change, the Microfinance private institution and civil society are also closely involved.

An interesting feature of the project is the focus on gender, strengthening women's involvement in the CCA system. The project will provide women with regular access to information and credit for production. As women play a vital role in community-based production systems, this initiative will involve women in the implementation of all the project deliverables, ranging from access to information, to credit and microinsurance. The design of training modules on climate risk management will enable women to benefit from current knowledge on CCA and risk management.

The promotion of financial risk transfer mechanisms to help rural households minimize losses and provide safety nets against climate shocks contributes to providing a more comprehensive approach to DRR and CCA integration.

The approach in Chad sees a national policy that is focused on community resilience and capacity-building for the disaster and climate risks that affect rural households directly, by recognizing and supporting the role of women in these communities as leaders and primary producers.

352 (State of Palestine 2016)

Case study: Philippines national adaptation plan

The Philippine Disaster Risk Reduction and Management Act and its institutional system is often cited as a positive example of a strong emphasis on risk reduction in a developing country that faces extraordinary levels of natural hazards – hydrometeorological and geological. Less well known is the Philippine Climate Change Act, which aims to mainstream climate action into all government ministries through the advocacy and technical support of the Climate Change Commission. These laws refer to each other in ensuring synergies and coherence on CCA and DRR, and both also include gender equality provisions and representation of women's organizations.

The National Economic and Development Authority has led the development of the Guidelines on Mainstreaming Disaster Risk Reduction in Development Planning. The results of assessments based on the guidelines are used to enhance all aspects of the planning process: visioning, analysis of the planning environment, and derivation of development potential and challenges; translation into corresponding goals, objectives and targets; and specification of the appropriate strategies and programmes, projects and activities.

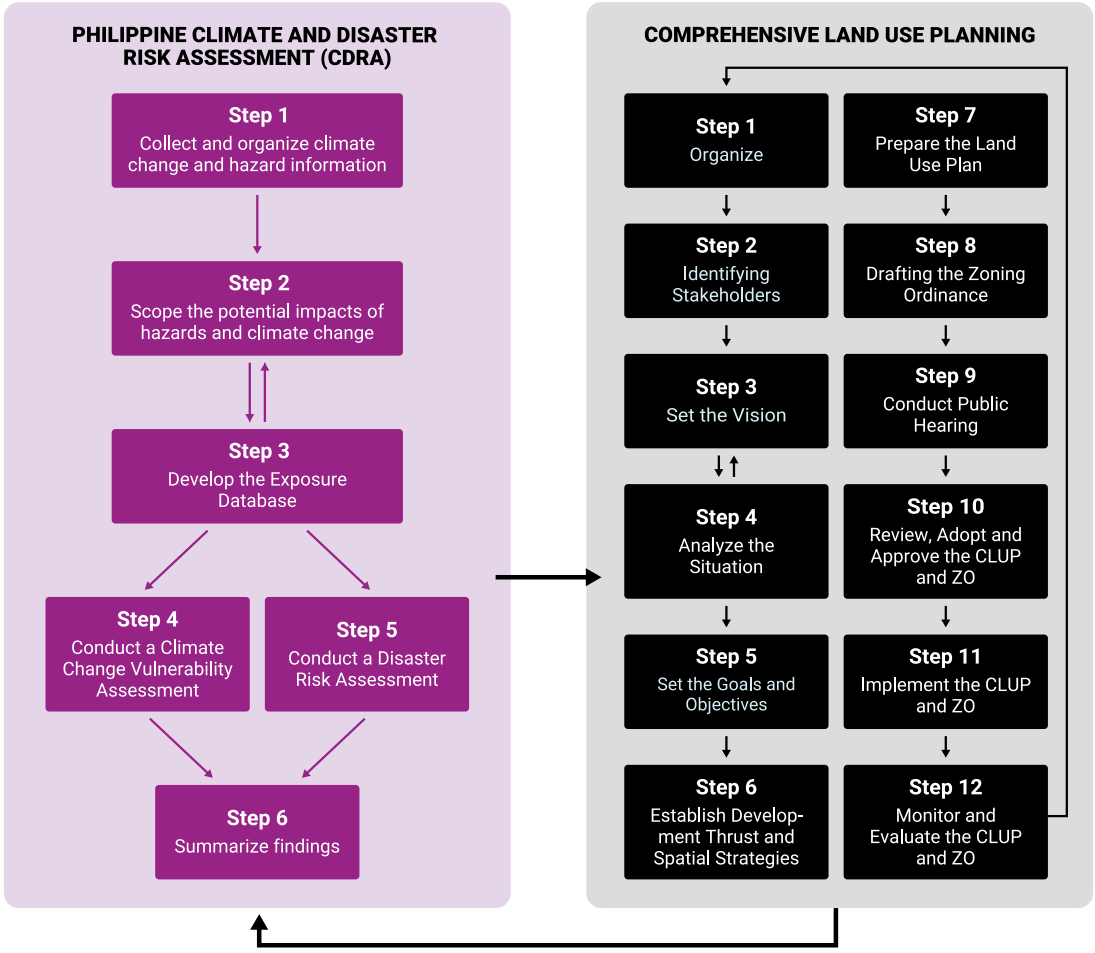
Features of the combined approach include mainstreaming of CCA and DRR into comprehensive land-use plans prepared by each local government unit, as part of the building-back-better approach. These plans define the land use of a particular administrative area and are one of the important entry points for mainstreaming CCA and DRR.

In 2015, the Supplemental Guidelines on Mainstreaming Climate and Disaster Risks in the Comprehensive Land Use Plan was developed by the Housing and Land Use Board with the Climate Change Commission, adding the integration of climate change considerations as part of risk assessment. These guidelines help local governments formulate climate and disaster risk-sensitive comprehensive land-use plans and zoning ordinances that guide allocation and regulation of land use so that exposure and vulnerability – of the population, infrastructure, economic activities and environment – to natural hazards and climate change can be minimized or even prevented. The resulting improvements in land-use planning and zoning processes will strengthen the ability of local governments to achieve their Sustainable Development Objectives given the challenges posed by climate change and natural hazards.

The example from the Philippines shows how integration of DRR and CCA can be successful from national, to sectoral, to local levels, including an integration of knowledge management and data provision. Strong political will, in part due to an extremely high-risk environment, has accelerated the process, and a solid governance framework involving all relevant actors has supported practical action and implementation.

353 (De Bettencourt et al. 2013)

Figure 13.3. Mainstreaming framework of climate and disaster risk assessment into comprehensive land-use planning in the Philippines



(Source: Policy Development Group, Housing and Land Use Regulatory Board, Philippines 2014)

13.4.5

Other integrated strategies and plans

Well-defined national legislation can set the preconditions for successful integration of DRR and CCA, and establish a coordination mechanism, but defining and coordinating institutional arrangements for climate- and disaster-resilient development often remains difficult. This can be due to institutional resistance, given that different institutions have historically driven climate change and DRM agendas with separate financial sources.[353] Emerging experience indicates that to have effective convening power, the relevant agency should be located at the highest possible level of government. Indeed, as climate and disaster risk affect multiple sectors, the lead agency needs to have a strong convening power of decision makers from multiple agencies and levels of government, as well as the private sector and civil society.

Case study: Mexico

Mexico has the General Law on Climate Change 2012, and the Special Climate Change Program 2014–2018, which is a planning instrument to establish climate adaptation and mitigation priorities.[354] Through these mandates, DRR has been integrated into the formulation of the NAP and NDC of Mexico for the period 2020–2030.[355] It has also been integrated into CCA strategies and plans through two programmes: the National Program Against Hydraulic Contingencies and the National Program Against Drought. These programmes are implemented by multiple institutions, coordinated by the Inter-Ministerial Commission for Attention of Droughts and Floods.

In Mexico, the actions selected to integrate DRR into adaptation plans include:

- Implementation of water reserves for environmental needs and to meet future water supply demand
- Development of algorithms for better measurement of the extent and distribution of water reserves in complex basins
- Drought EWS
- Establishment of risk reduction measures for the agricultural sector, including drought scenarios
- Fluvial restoration measures and hydrological-agroforestry restoration of watersheds
- Measures to improve drainage of linear infrastructures
- Flood prediction measures
- Insurance promotion
- Improvement of the hydrometeorological monitoring network, which reports in real time, and implementation of numerical flooding and drought models

Some conducive or hindering factors in the development and implementation of DRR-informed adaptation strategies or plans can be derived from the Mexico case. The strong political support of the federal government ensured that a strong governance mechanism for CCA with risk reduction components could be established. The use and availability of integrated flood and drought management concepts and modelling data allowed substantive development and integration. However, capacity gaps, such as the lack of sufficiently trained personnel and low numbers of monitoring stations, related to budget and financing, represented hindering factors as insufficient communication among participating institutions.

The Mexico example shows that strong political will, based on an understanding of risk, can result in the establishment of an efficient governance mechanism, which can overcome capacity gaps and limited budget.

In addition to NAPs, which are tailored to the UNFCCC reporting structure and GCF, Member States of all levels of incomes and types of economic development are addressing climate and disaster risk as part of integrated national and local policy and planning processes. For example, in Costa Rica, the National Disaster Risk Management Policy and the National Adaptation Policy adopted in 2017 were formulated with the participation of communities of practice and shared responsibilities in implementation. In Mozambique, as described in Chapter 11, the Disaster Risk Reduction Master Plan (2017–2030) is aligned with the Climate Change Adaptation and Mitigation National Strategy, as well as with other policy instruments. In both these cases, common mechanisms and

indicators have been articulated for the strategies or plans.

In Africa, Namibia has taken steps to integrate DRR with CCA priorities through the National Strategy for Mainstreaming Disaster Risk Reduction and Climate Change Adaptation (2017–2021). Several other countries' strategies and plans establish links among DRR, climate change, health, environment or other developmental goals through the involvement of competent ministries or coordination mechanisms. However, such formulations appear to be too generic to lead to concrete joint or complementary action and implementation. A study on Kenya points out that the roles of country governments and the National Drought Management Agency in support of resilience are complementary, but that there is little evidence to suggest they are working together in practice.[356]

Chapter 11 of this GAR observed that Chapter 4 of Mozambique's Master Plan for Disaster Risk Reduction 2017–2030, establishes the National Juridical Context and Public Policies, which articulates linkages with the country's National Development Plan, the National Agenda 2025: Visão Estratégica de Nação, the National Climate Change Mitigation and Adaptation Strategy 2013–2025, and the Sustainable Development Objectives. The plan contains actions reinforcing resilience that range from the development of educational approaches integrating risk reduction and CCA (Action 1.1.3), to the creation of mechanisms to ensure that all projects and programmes relating to poverty reduction, agriculture and rural development take into account access to water, environmental considerations and contributions to the sustainable use of water (Action 2.3.1).[357] At the time of writing, Mozambique was reeling from the passage of Cyclone Idai, which made landfall on 14 March, 2019. It flooded an area estimated at approximately 520 km^2 with wind speeds of approximately 160 km/h, and caused extensive storm damage that was particularly severe in the city of Beira. Preliminary estimates cited at least 600 killed, more than 1.5 million people affected and hundreds of thousands of hectares of crops damaged. A post-disaster needs assessment was initiated on the 16 April. Hazards of the magnitude of Idai test the resilience and capacity to cope of any country. However, in due course, ex post evaluations of the root causes of loss and damage may indicate achievable opportunities for reducing risk.

In 2011, Nepal developed a National Framework on Local Adaptation Plans for Action, in addition to its NAPA.[358] Implementation has been a challenge, but recently, several government, non-government and international institutions have been focusing on activities related to climate adaptation for enhancing the adaptation capacity of the most vulnerable. Water, health, sanitation, agriculture, biodiversity, food security and nutrition have been identified as the most vulnerable sectors to climate impacts, and are taken as priorities for providing support to local vulnerable people.[359] Others have focused on the concept of climate-smart villages and an integrated approach to local level resilience.

Brazil directly referenced the Sendai Framework in its NAP.[360] The Netherlands has developed a long-term planning vision for water management that considers climate change scenarios and has developed integrated safety and adaptation policies to handle risk. Other countries (e.g. France, Spain and the United Kingdom of Great Britain and Northern Ireland) have collaborated with the private sector to install insurance and risk financing mechanisms based on public–private partnerships, while others such as Switzerland have enabled vertical collaboration with local governments by setting up a multi-level risk governance system.

354 (Mexico, Ministry of the Environment and Natural Resources 2014)
355 (Mexico 2016)
356 (Omoyo Nyandiko and Omondi Rakama 2019)
357 (Information provided to UNDP by Government of Mozambique 2017)
358 (Nepal, Ministry of Environment 2010); (Nepal, Ministry of Forests and Environment 2018)
359 (Dhakal, Wagley and Karki 2018)
360 (Brazil, Ministry of Environment 2016); (Urrutia Vásquez et al. 2017)

13.5

Pacific region approach to integrated climate, disaster and development policy

13.5.1

Regional approach to support integration – Framework for Resilient Development in the Pacific

As noted in section 10.1 on regional approaches and in section 11.5 in relation to policy coherence, the Pacific region is leading the way, at regional and country levels, in integrating reduction of climate and disaster risk with development planning in FRDP.[361]

Although it is not prescriptive, FRDP suggests priority actions to be used as appropriate by different multi-stakeholder groups, at regional and national levels, in sectors or other groupings as appropriate.[362] Its implementation was also supported by the Pacific Resilience Partnership established by Pacific leaders in 2017 for an initial trial period of two years. The partnership works to strengthen coordination and collaboration, working with a multi-stakeholder task force, a support unit, technical working groups and Pacific resilience meetings.

13.5.2

Pacific countries

Given the importance of climate-related disasters to the Pacific Islands, many countries of the region have developed JNAPs, action plans that consider DRM and CCA, since 2010. This process began well before the 2016 FRDP, which evolved at the regional level from national practice.

JNAPs normally reflect a recognition of the relationship among development, disaster and climate risk and the role of environmental management in development and risk management.[363] The Cook Islands, the Marshall Islands, Niue and Tonga represent some of the countries that have developed and published their JNAPs, while Vanuatu has chosen an alternative route through national legislation and institutional restructuring to integrate DRR and CCA.

There are two broad approaches followed by Pacific Island countries regarding JNAPs and NAPs. One set of countries works on formulating NAPs explicitly, with proposals and/or plans under way to access the GCF NAP formulation funding (e.g. Fiji, Tuvalu and Vanuatu). Another set of countries characterize their JNAPs as their NAPs (Cook Islands, Kiribati, Marshall Islands, Nauru, Niue, Palau and Tonga). The second group of countries is planning to use the GCF NAP formulation funding to revise or update CCA components of their JNAPs to ensure full coverage of the features of NAPs.

One country, Samoa, is applying its national development strategy as the overarching plan for development planning, climate change, DRR, SDGs, etc., all in one, with no separate plans for the different issues. Implementation of activities is coordinated through the country's medium-term expenditure framework.[364]

The Cook Islands launched its second plan, JNAP2, in 2016, covering the period 2016–2020. This JNAP2 has nine sectoral strategies to ensure a safe, resilient and sustainable future. It aims at strengthening climate and disaster resilience to protect lives, livelihoods, economic, infrastructural, cultural and environmental assets in the Cook Islands in a collaborative, sectoral approach. The Paris Agreement and Sendai Framework are mentioned in the foreword, and there is a mapping of how both have informed JNAP.[365]

The Kiribati Joint Implementation Plan (KJIP) is being updated to complement the National Disaster Risk Management Plan and the National Framework for Climate Change and Climate Change Adaptation.[366] Among other things, the KJIP revision

Honiara beach debris
(Source: UNDDR)

responds to the gender equality policy imperative set out in the Paris Agreement.

The Marshall Islands is updating its JNAP 2014–2018. It has set the adoption of SDGs, the Paris Agreement (together with NDCs and NAPs) and the Sendai Framework as the national policy context and guiding principles for updating its JNAP. The country plans to align its National Framework for Resilience Reform with its NAP to ensure appropriate relevance to funding.

Vanuatu has integrated CCA and DRR institutions and policy development processes.[367] The National Advisory Board on Climate Change and Disaster Risk Reduction is jointly directed by the Vanuatu Meteorological and Geohazards Department and NDMO, and operates as Vanuatu's principle policy, knowledge and coordination hub for all matters concerning climate change and DRR. This was set up before the new law that formalizes integration.[368]

361 (SPC 2016)
362 (SPC 2016)
363 (Secretariat of the Pacific Regional Environment Programme 2013)
364 (Samoa 2016)
365 (Cook Islands 2016)
366 (Kiribati, Office of Te Beretitenti 2013); (Kiribati 2012)
367 (Vanuatu 2015); (Jackson, Witt and McNamara 2019); (UNDP 2019q)
368 (Vanuatu 2017)

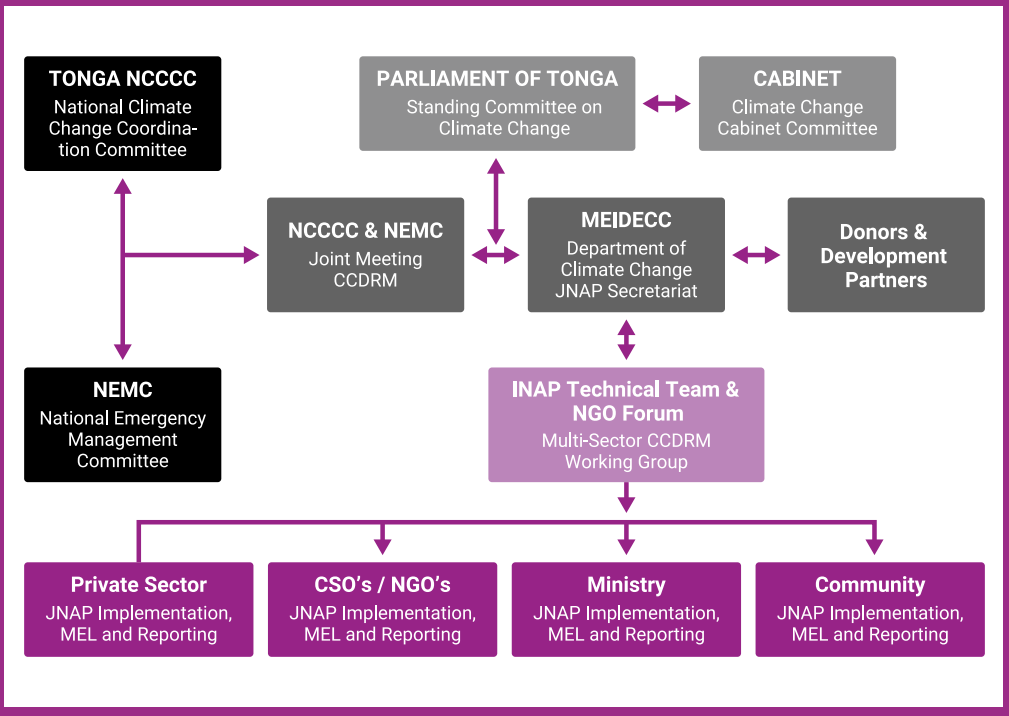
Case study: Tonga

Tonga was the first country in the region to develop its JNAP 2010–2015. This was conceived when Tonga was considering developing its Disaster Risk Management Action Plan under HFA, in conjunction with the regional DRM framework that was in place, the Pacific Disaster Risk Reduction and Disaster Management Framework for Action. At the same time, Tonga was developing its NAPA for climate change under UNFCCC and the Pacific Islands Framework for Action on Climate Change. An integrated approach to CCA and DRR made sense given community vulnerabilities and risk profiles of the archipelago, and was also the most efficient approach for capacity-constrained governments.

The experience of Tonga, together with other countries in the Pacific, helped prepare the way for the 2016 FRDP.

The approval of the Tonga Climate Change Policy in January 2016 triggered the review of JNAP 1 on climate change and DRM (2010–2015), and a second JNAP to 2028 was approved in May 2018.[369] The second JNAP process also had clear roles for relevant stakeholders, led by the Department of Climate Change at the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications, with support of a JNAP task force.

Figure 13.4. Institutional arrangements for Tonga JNAP version 2



(Source: Tonga 2018)

JNAP is recognized as the summary of the country's priorities regarding disaster risk and climate risk management. A high-profile document for the government and NGOs and partners, JNAPs are referred to by implementing ministries and NGOs refer to in their project proposals – notably for projects related to climate change – reflecting the efficacy of this governance mechanism. The establishment of robust governance arrangements and approaches to integration, with dedicated technical resources are key success factors in Tonga. A three-person JNAP Secretariat, for which human and financial resources have been made available, provides a focal point for activities identified for the JNAP Technical Committee, and is acknowledged as critical in the successful coordination of JNAP in Tonga. While enduring external support by development partners is recognized as having been essential to ensure implementation, these resources may not be sustainable in the long term.

The Tonga case study demonstrates that policy and institutional integration is possible where there is a high degree of overlap between disaster and climate risk and obvious connections to national development. It also demonstrates that integration can be an efficient solution for a small government, when backed by strong governmental commitment to JNAP priorities thereby attracting long-term resource commitments from development partners.

13.6

Conclusions

Coordinated national policymaking for climate change adaptation and disaster risk reduction

Coordination can be achieved most effectively at the national level during the production of strategies and plans in support of development. CCA and DRR are both sufficiently flexible concepts to enable countries to develop and implement plans and strategies based on national circumstances and needs.

How countries report and produce plans in response to different multilateral agreements is a different issue; at times, such requirements can militate against integration. The international context also includes coordination of support that comes under the different umbrellas based on the special requirements of each source.

Coordinated national technical assessments and solutions for the full spectrum of risk

Risk assessments for climate change and disasters are often carried out by different teams, and are supported and guided by different agreements and bodies internationally. It must be recognized that although disaster and climate risk have significant overlap, there are also substantial aspects in which they do not coincide, and this is an important challenge for integrated risk governance at national and local levels. However, in the realm of hydrometeorological risk for example, a suite of applicable tools are available including those that address adaptation/risk reduction, either planned or contingent, and management of extremes and disaster losses. A country could choose to coordinate these aspects of CCA/DRR assessments, provided the assessments cover the dimensions and timescales relevant to each type of risk, from the present through to the medium and long terms.

However, as set out in Part I of this GAR, in fully integrated approaches under the Sendai Framework, assessments and solutions must also consider

369 (Tonga 2018)

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 UNDDR 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 hydrometeorological 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

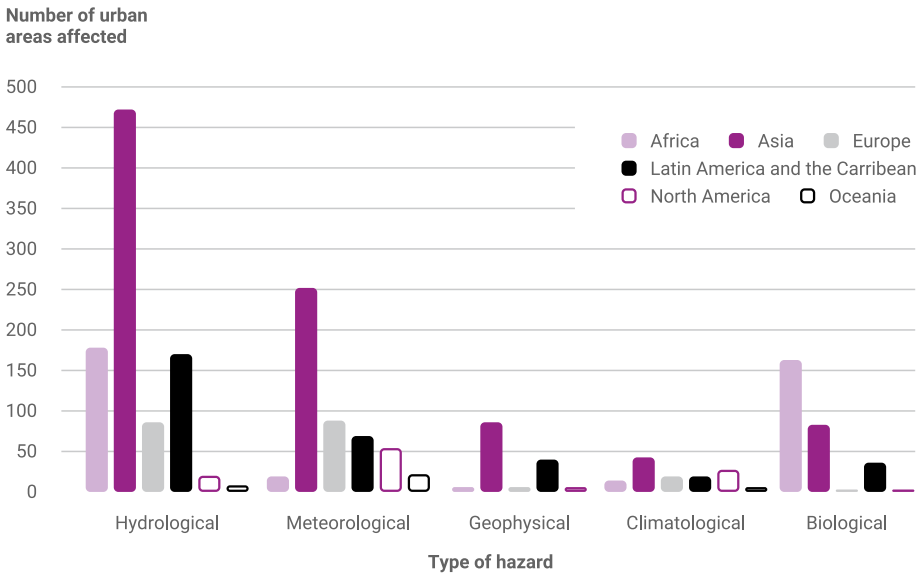
Developing urban resilience has been the subject of a global effort and is enshrined in a number of international frameworks – including the Sendai Framework, the 2030 Agenda and NUA – all of which recognize the importance of urban action by local and subnational governments to create inclusive, safe, 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 inclusive

370 (United Nations 2015a)
371 (Gencer and UNISDR 2017)

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]

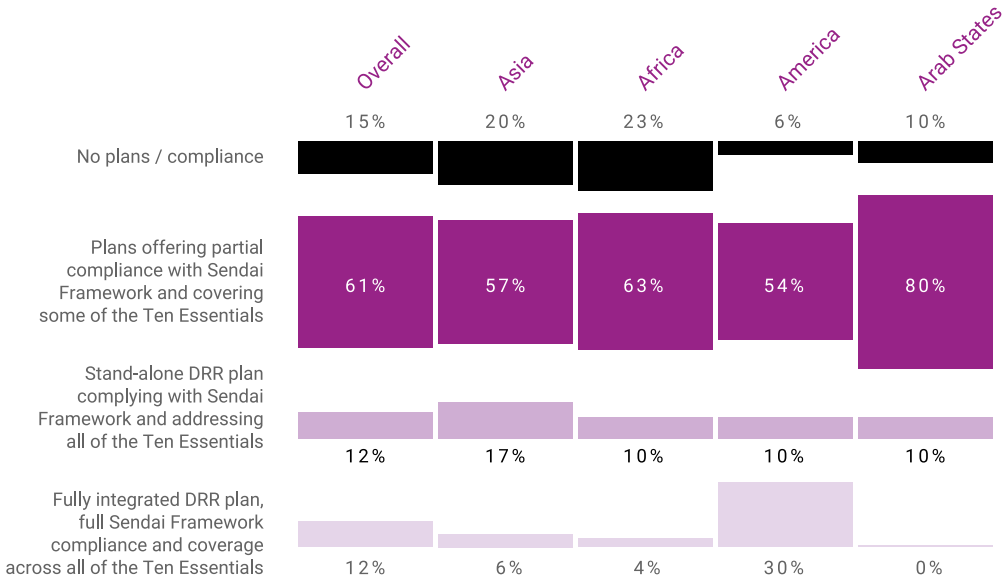
Figure 14.2. Ten new essentials of the MCR Campaign used to develop local DRR strategies and plans

(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



(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

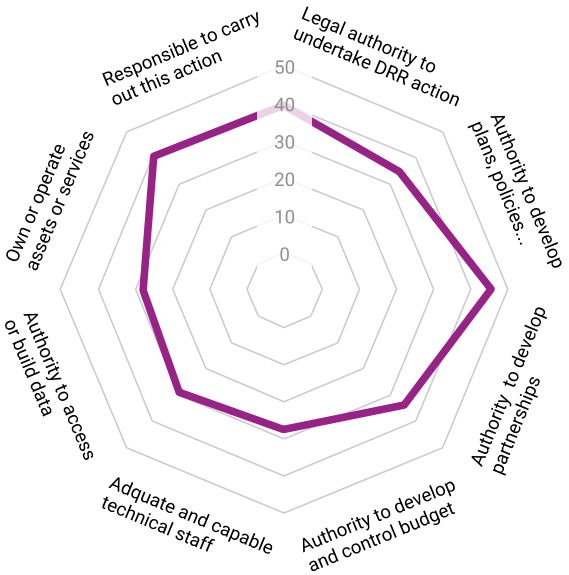
m. Developing a strategy for post-disaster recovery and reconstruction that ensures building back better

(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 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]

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.

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)
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.

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 response[427] and DRR[428] are implemented are therefore more complicated and challenging than is often acknowledged or represented in policy and programmatic documents. This leads to questioning how to effectively

425 (Lo et al. 2017)
426 (Peters and Peters 2018)
427 (Hilhorst et al. 2019)
428 (Harris, Keen, and Mitchell 2013); (Peters 2018)

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 understand, 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

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)

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.

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 socioeconomic 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)

Rohinggya 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 people[437] – 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 m^3 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 services that are already extended to or beyond capacity, particularly in situations of political

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)

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 the effects of monsoon rains; as evidence by flash flooding and landslides in 2018. Rains "caused over 130

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)

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 heat-waves stretch humanitarian and health systems and point to the necessity of preparing institutions to reach the most vulnerable.

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

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)

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.

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)

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.

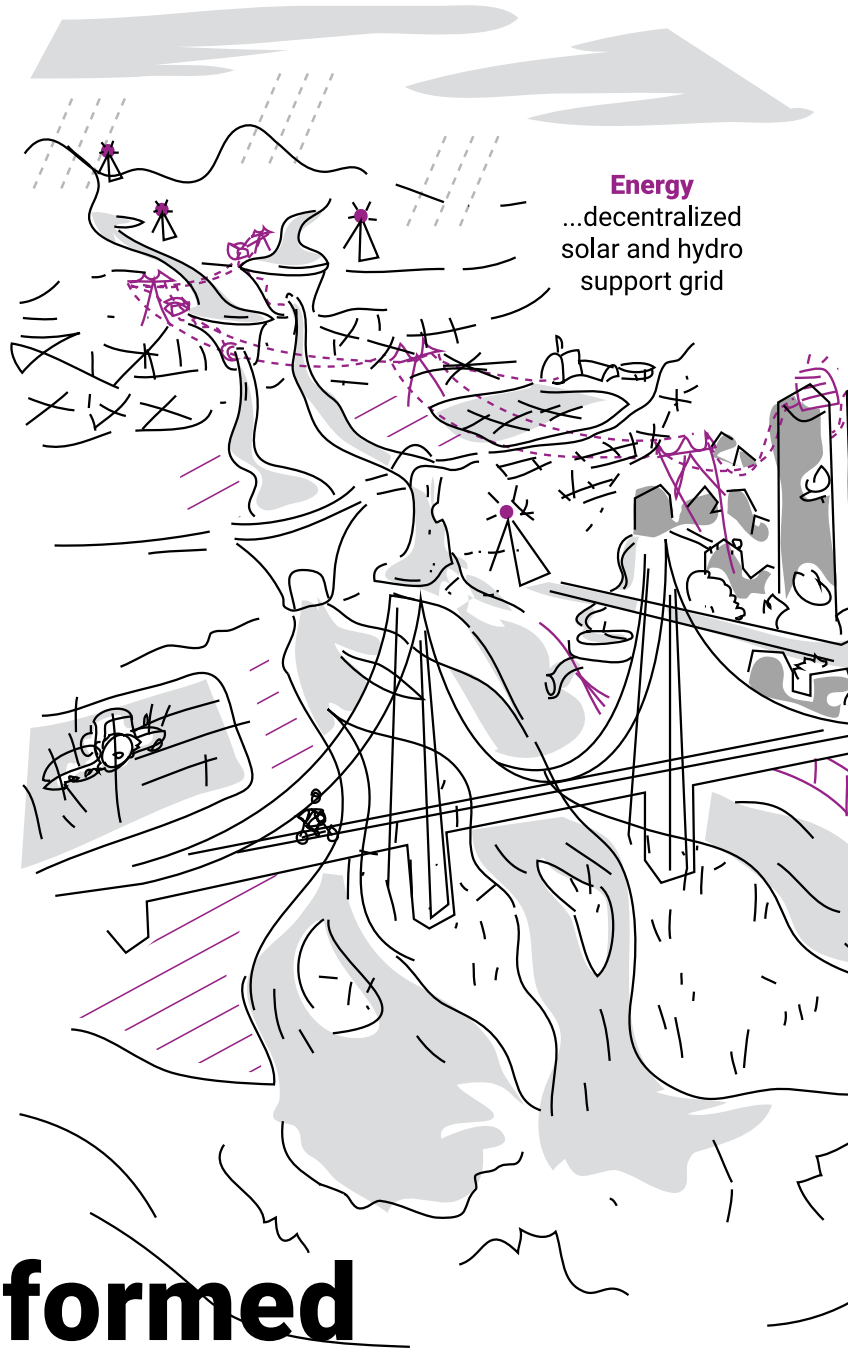
A major challenge in integrating DRR with CCA and development planning is that faced by national and local governments in managing systemic risk in urban areas (Chapter 14). The dynamic, multidimensional nature of interrelating risks in urban areas require systemic approaches, that seek to understand 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:

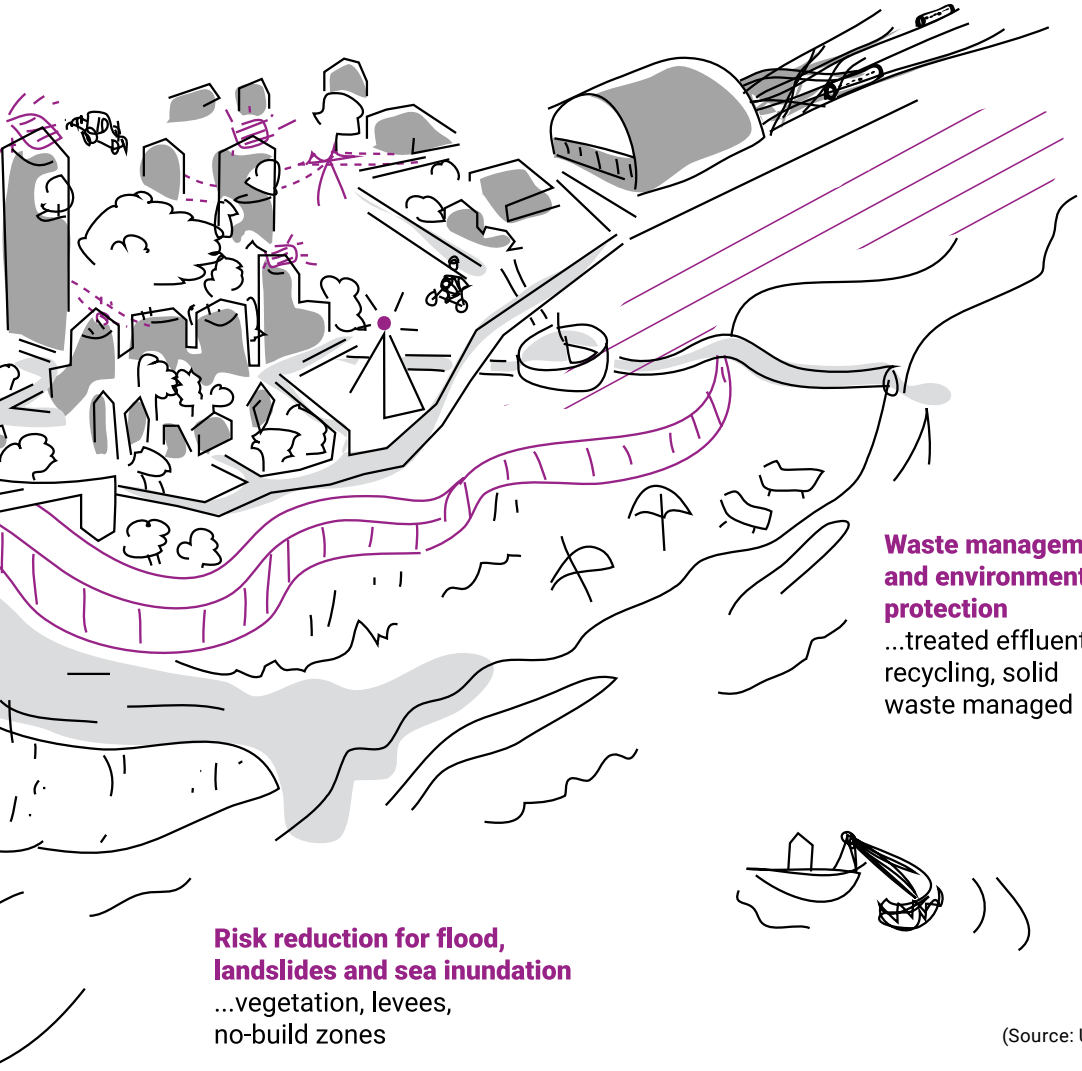
- It is urgent that all **Member States give attention to establishing and aligning national and local DRR strategies with the Sendai Framework**, not only because 2020 is fast approaching, but because these provide the foundation and enabling environment for so much of what is required to achieve the 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, AAAA, 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**.



Risk-informed development in an urbanizing world

Health, housing and wellbeing
...safe building, social housing, green infrastructure

Transport, communications and other infrastructure
...climate and disaster resilient structures and systems



Waste management and environmental protection
...treated effluent, recycling, solid waste managed

Risk reduction for flood, landslides and sea inundation
...vegetation, levees, no-build zones

(Source: UNDRR 2019)

Fictional delta city of Drecca-Susdev –elements of integrated risk governance

Managing complex risks while also governing the everyday aspects of life and encouraging socioeconomic development can seem remote and theoretical. It can also be hard to imagine what success looks like in the face of so many demands. For this reason, this GAR offers an illustrated scenario of a fictional coastal delta city, Drecca-Susdev, which has taken a systems-based approach to managing risk. It is selective – it may even appear futuristic – but it is based on careful expert thought and is offered as an exercise of imagination towards "the future we want".

Many coastal delta cities face seasonal flood risk, cyclonic wind and storm surge, and potentially seismic and tsunami risk. They are looking to a future of sea-level rise and increased weather extremes due to climate change, coupled with the socioeconomic challenges of rapid population growth, increased exposure and vulnerability, building and construction, energy needs, risk of environmental pollution, pressures on waste management, water and food resources, transport and communications systems, as well as the urgent global need to reduce GHG emissions to mitigate climate change. Meeting these challenges and moving towards risk-informed sustainable development requires an understanding of the interrelationships among systems and subsystems, within local area planning and risk governance, and aligned with national socioeconomic development planning.

The figure illustrates some elements of integrated risk governance in the fictional coastal delta city, Drecca-Susdev. These include:

1. **Risk reduction for flood, landslides and sea inundation:**
    - Revegetation and/or engineering stabilizes landslide-prone areas
    - Smaller more numerous dams reduce flood risk from dam failure
    - Homes, businesses and sensitive infrastructure are kept off flood plains and the coastal foreshore, or raised/adapted to seasonal flooding/storms and built to relevant codes
    - Floodplains and coastal foreshore are reserved for recreation, and for vegetation that absorbs flood waters or sea storm impacts
    - Mechanical or built barriers reduce impact and/or divert flood waters or storm surges

2. **EWSs:**
    - EWSs for flood and landslide risk based on weather forecasts, recorded rainfall and intensity, and for monitoring upstream river levels allow for flood mitigation through controlled dam releases, opening/closing of flood gates/levees around the city and evacuation response when needed
    - EWSs for sea storms, hurricanes and/or tsunami, based on weather forecasts, seismic activity and other monitoring including regional/global systems allow for evacuation and use of mechanical barriers as needed

3. **Health, housing and well-being:**
    - Medium- to high-density residential buildings on safe land include social housing, comply with updated codes for relevant risks, have water and sanitation, have access to health, welfare and education facilities, and give access to fire and emergency services
    - "Green infrastructure" gardens and trees cool the city, improve health and provide space for recreation and cultural pursuits
    - Walking and cycling route networks improve safety and health, and reduce air pollution from vehicles

4. **Water supply system:**
    - Multiple small dams give redundancy in water supply for farms and city, increasing drought resilience across the territory
    - Potable water systems, pumps and treatment are flood-proofed

- Water is reused and recycled in the city, with a back-up energy source

5. **Food supply system:**
    - Flood plains are preserved for crops that use seasonal flooding that also regenerates soil fertility
    - Flow-of-the-river dams allow fish breeding
    - Urban agriculture on balconies and rooftops boosts access to fresh produce; high-density commercial aquaponics food production combines plant and fish nutrient needs to reduce ocean overfishing and agricultural nitrogen run-off
    - Resilient transport and communications maintain local and regional food supply chains

6. **Waste management and environmental protection:**
    - All storm water run-off and human and industrial refuse and effluent is treated so that clean water is released into the land and marine environments
    - Recycling of materials is maximized
    - Solid waste is managed city wide

7. **Transport, communications and other infrastructure:**
    - Bridges and roads are elevated and built strong enough to withstand more-extreme weather events and sea-level rise
    - Risk-assessed dedicated public transport is separate from the road system
    - Disaster-proofed communications infrastructure increases resilience of all other city systems, including energy and supply chains
    - Transport and communications systems are designed to reduce cyberrisk with flexible system responses and redundancy

8. **Energy:**
    - Small-scale hydro-dams supply local areas, and link into the power grid
    - Decentralized solar photovoltaics on city rooftops that heat, cool and power buildings, and which include energy storage and charging for electrical vehicles, reduce the need for major new investment in power distribution and increase resilience to grid system failures