UNISDR
United Nations Office for Disaster Risk Reduction

How To Make Cities More Resilient
A Handbook For Local Government Leaders

A contribution to the Global Campaign 2010-2020

Making Cities Resilient – “My City is Getting Ready!”

Making Cities Resilient - My City is Getting Ready

Launched in May 2010, the **Making Cities Resilient: "My city is getting ready!"** Campaign addresses local risk governance, urban risk and resilience. The Making Cities Resilient Campaign will continue beyond 2020 with the support and recommendations of many partners and participants. This has been assured through two documents adopted by government and international stakeholders: the Local and Sub-National Governments Declaration at the 2015 UN World Conference on Disaster Risk Reduction in Sendai, Japan, and "The Florence Way Forward" adopted at the High-Level Forum on Implementing the Sendai Framework for Disaster Risk Reduction at the Local Level in Florence, Italy in June 2016.

2015-2020: From awareness to implementation and beyond

Together with its partners, the United Nations Office for Disaster Risk Reduction (UNISDR), through the Making Cities Resilient: "My city is getting ready!" Campaign supports activities that promote resilience, sustainable urban development and increased understanding of disaster risks by stakeholders in their respective localities.

The campaign has entered a new phase with the adoption of the Sendai Framework for Disaster Risk Reduction: 2015-2030. The campaign's first phase (2010-2015) was highly valued by partners and participating cities.

As a result of its success, the campaign will continue to shift its focus towards more implementation support, city-to-city learning and cooperation, local action planning and the monitoring of progress in cities. The campaign shall also continue its mission to advocate for widespread local government commitment to build resilience against disasters as well as consistent national government support to cities to further strengthen capacities while implementing the Sendai Framework at the local level. The Ten-Point checklist of Ten Essentials for Making Cities Resilient serves as a reliable guide to city actors in fulfilling their commitment to the Sendai Framework goal. The checklist is the organizing principle for reporting and monitoring during the campaign.

Photo: UNISDR

Kick-off workshop for Making Cities Resilient in Americas

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Geneva, 2017 version

United Nations

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Table of Contents

Foreword

The 2015 UN World Conference on Disaster Risk Reduction in Sendai, Japan and 2016 High-Level Forum on Implementing the Sendai Framework for Disaster Risk Reduction at the Local Level in Florence, Italy, guaranteed that the Making Cities Resilient: “My city es getting ready!” Campaign would continue beyond 2020.

Losses due to disasters have been mounting; disasters cause an annual USD$ 314 billion losses in the built environment alone. The impact of climate change and disasters is likely to be severe in urban centers where exposure is high due to population density and a heavy concentration of critical infrastructure.

Highly acclaimed since its launch in May 2010, the Making Cities Resilient Campaign has been consistently addressing local governance and urban risk issues. A major output of the Campaign is the Handbook, which is designed primarily for the local government leader and policy maker – the mayor, the governor, the person in charge of a city, municipality, district, province, or region. It seeks to support public policy and decision making to allow implementation of activities to reduce disaster risk and build resilience. The Campaign offers practical guidance for local government leaders to take action and make disaster risk reduction (DRR) work for all involved.

This second edition of the Handbook contains: an introductory part; the main body elaborating on the rationale for investing in disaster risk reduction (DRR) and resilience, the New Ten Essentials for Making Cities Resilient, the five (5) steps to develop a process called the Resilience Building Cycle, and annexes containing useful resources for Handbook users. Several practical examples illustrate how local governments, together with stakeholders and partners, are able to achieve resilience. These examples demonstrate that local governments can embed disaster risk reduction in their development strategies to the benefit of their citizens.

Robert Glasser
UN Special Representative of the Secretary-General for Disaster Risk Reduction

Introduction

"The Global Making Cities Resilient Campaign is a great opportunity to change paradigms and contribute to the reorganization of the National System of Protection and Civil Defense. It allows for greater scope and national coordination and strengthens prevention as key to strategic planning in disaster risk reduction."

Mr. Furtado, from the Civil Defense of Campinas, acknowledged the work of the state government of Campinas particularly how the Campaign topics were taken up in its administration and a municipal civil defense team was mobilized to support the promotion of the Campaign.

"The mayor of Campinas, Jonas Donizete and all the staff of the Civil Defense played a key role in the realization of this work, everyone has played a part to accomplish the final result," he added."

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Sidnei Furtado (centre), Director, Civil Defense of Campinas, Brazil and Advocate of the Making Cities Resilient Campaign, together with the team.

This Handbook is designed primarily for local government leaders and policy makers. It seeks to support public policy and decision making so they can implement activities to reduce disaster risk and build resilience. It sets out practical guidance for putting the "Ten Essentials for Making Cities Resilient" into action.

Since the first edition of the Handbook, local governments all over the world have come up with concrete ways to reduce disaster risk and boost resilience. Resilience – as agreed through an intergovernmental process – is "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner." There is no one-size-fits-all solution to achieve resilience. Local government actors will determine how these actions apply to their own contexts and capacities. In the urban setting, risk management is an essential part of building resilience.

This Handbook showcases the knowledge and expertise of several Campaign cities. It responds to the call for better access to information and knowledge resources, and tools to effectively deal with the impacts of natural hazards and climate change. It provides an overview of key strategies and actions as part of an overall sustainable urban development strategy.

The annex to this Handbook contains links to tools, resources, and examples from partner cities. A web-based information platform, where cities and local governments can share their own tools, plans, regulations, and practices complements the Handbook (available at www.unisdr.org/campaign). Throughout the Handbook, we refer to "cities" and "local governments." The approach to resilience, as described, also applies to sub-national administrations of different sizes and levels, including at regional, provincial, and metropolitan, city, municipal, township, and village levels.

Understanding Risk

Mayors, local government officials, and decision makers are at the forefront of dealing with the impact of disasters—ranging from small and medium to less frequent large-scale events—that arise from natural or man-made hazards. Climate change and extreme weather events are likely to increase the city's exposure to hazards and risks. Less obvious is the fact that business-as-usual development practices may also generate complex environmental changes and contribute to increased risk unless these are anticipated and remedial measures are taken.

Being among the first responders during disasters, local governments are at times faced with wide-ranging responsibilities that demand certain capacities to deal with them. They are likely the first institutions to anticipate, manage, and reduce disaster risk. This is accomplished by setting up early warning systems and establishing specific disaster/crisis management organizational structures. In many cases, a review of mandates, responsibilities and attendant resource allocation is acutely needed to act on these challenges.

It is important to consider the elements of risk in order to understand how disasters unfold. Risks are the function of the hazard (e.g. cyclones earthquake, flood, or fire), the exposure of people and assets to hazards, and the conditions of vulnerability of the exposed population or assets. These factors are not static and can be improved, depending on the institutional and individual capacity to cope and/or act to reduce risk and increase resilience. Development patterns can increase exposure and vulnerability in the social and environmental realms and therefore create new risk.

$$\text{Risk} = \frac{\text{Hazard x Exposure x Vulnerability}}{\text{Coping Capacities}}$$

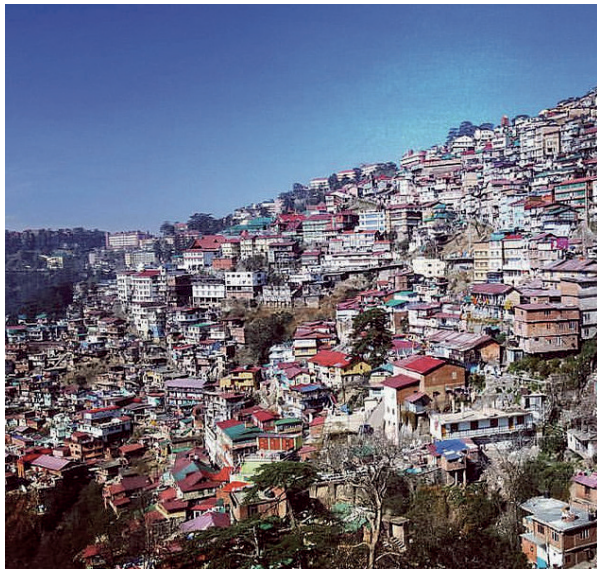
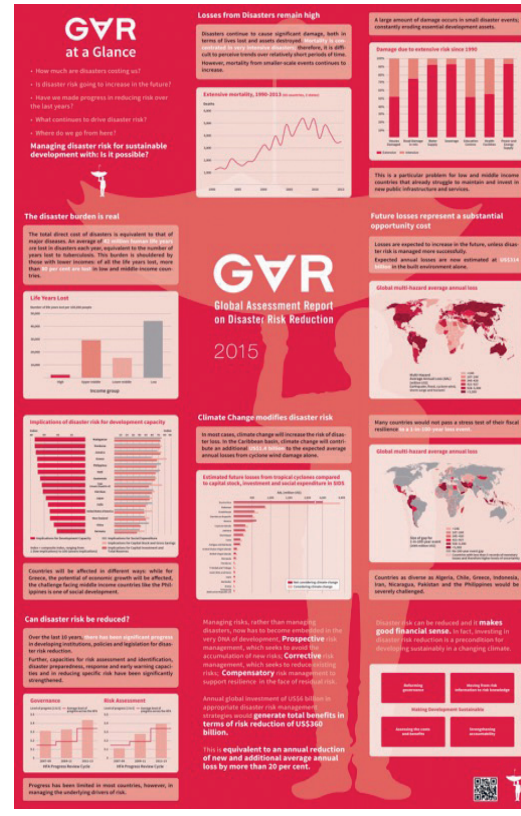


Photo: Garima Jain (IIHS and UPAG)

Haphazard and unregulated proliferation of dwellings (Shimla, India) intensifies exposure of people to risk.



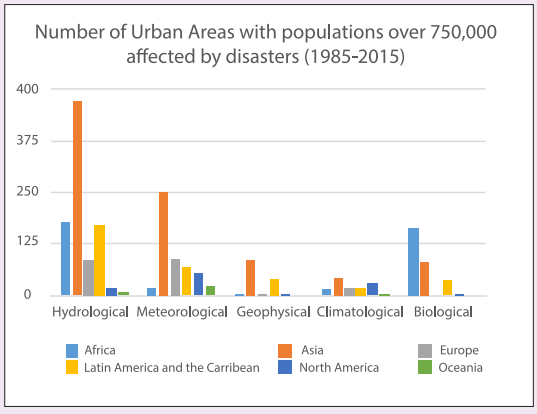
An Overview of Global Risk – Factsheet from 2015 Global Assessment Report on DRR

Why are Cities at Risk?

Drivers of Risk in the City Environment

More than 50 % of the world's population now reside in urban areas, and this is projected to increase to 66 % by 2050. Urbanization and the complex characteristics of cities can present opportunities for sustainable development, while at the same time they have the potential to increase vulnerabilities and risk. Physical and spatial characteristics of urban areas, socio-economic vulnerability of their citizens, inadequacy of institutional capacities and environmental challenges are some of the risk drivers that thrive under the complex situation that cities are in. Strategies and policies can be developed to address each of these issues and move towards safe, equitable, resilient and sustainable urban development.

Rapid urbanization puts pressure on land and services, if not met with sustainable planning and land-use decisions. Often, this leads to incoming populations settling in hazard-prone areas, such as in coastal lowlands, in floodplains or on unstable and steep slopes. Northern America, Latin America and the Caribbean, and Europe are the most urbanized regions with the ratio of urban to total population are 82%, 80% and 73%, respectively. However, Africa and Asia are urbanizing faster than the other regions. Urban areas in Asia, followed by those in Africa and Latin America and the Caribbean regions were the most affected urban areas by disasters that took place between 1985 and 2015, indicating the need to focus on these rapidly urbanizing regions.



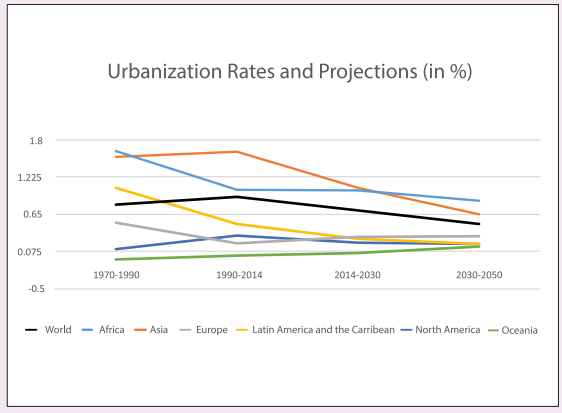


Figure 1:Urban areas in Asia, followed by those in Africa and the Latin America and the Caribbean regions have been the most affected by disasters that took place between 1985 and 2015.
Credit: CUDRR+R (Based on Data on 2014 World Urbanization Prospects, UN-DESA and EM-DAT, CRED)

In many cases, “with urban spatial growth, formerly independent administrative and political units of settlements have been incorporated to metropolitan cities, creating peripheral municipalities and generating new challenges in urban governance” (Gencer 2013). The urban poor, particularly those living in informal settlements, are disproportionately affected by hazards and often lack the resources to recover from disasters. Land tenure, social exclusion, ethnic or immigrant status, education and opportunities limit their mobility and resettlement after disasters (ibid.). In the high risk-prone Latin America and the Caribbean Region (LAC), 27 % of the urban population live in slums (Dodman et al. 2009). This ratio is much higher in some LAC countries; countries such as 45.5 % in Nicaragua and 70.1 % in Haiti (Gencer 2013).

Urban Poverty in Selected Countries (%)

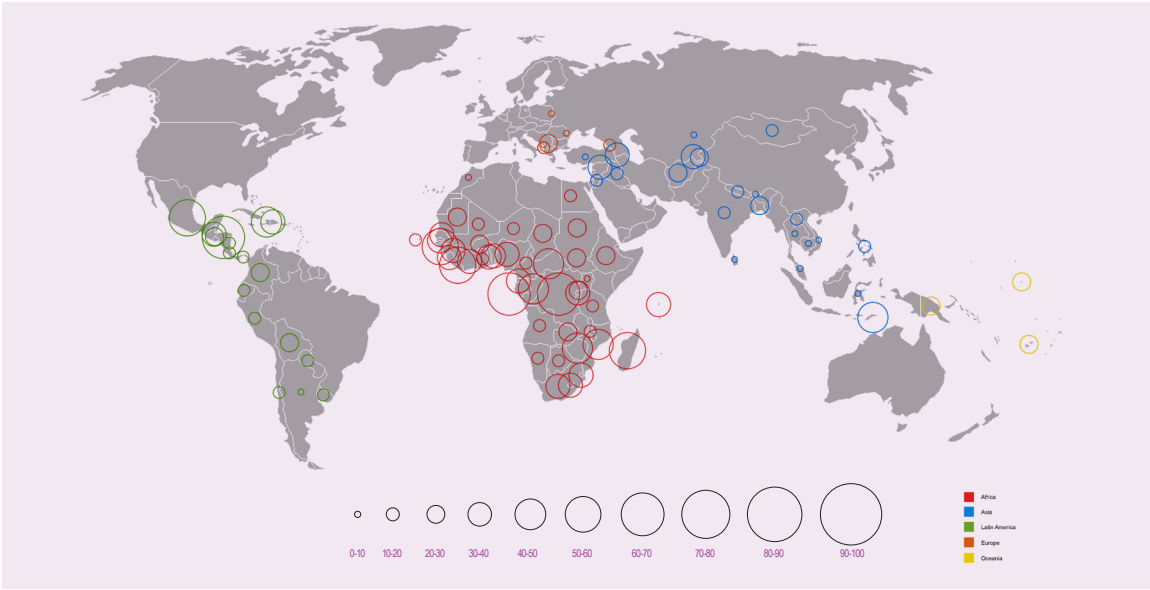


Figure 2: The map shown the extent of urban poverty in countries, where data is available.
Credit: CUDRR+R (Based on data on World Cities Report 2016 – UN-Habitat)

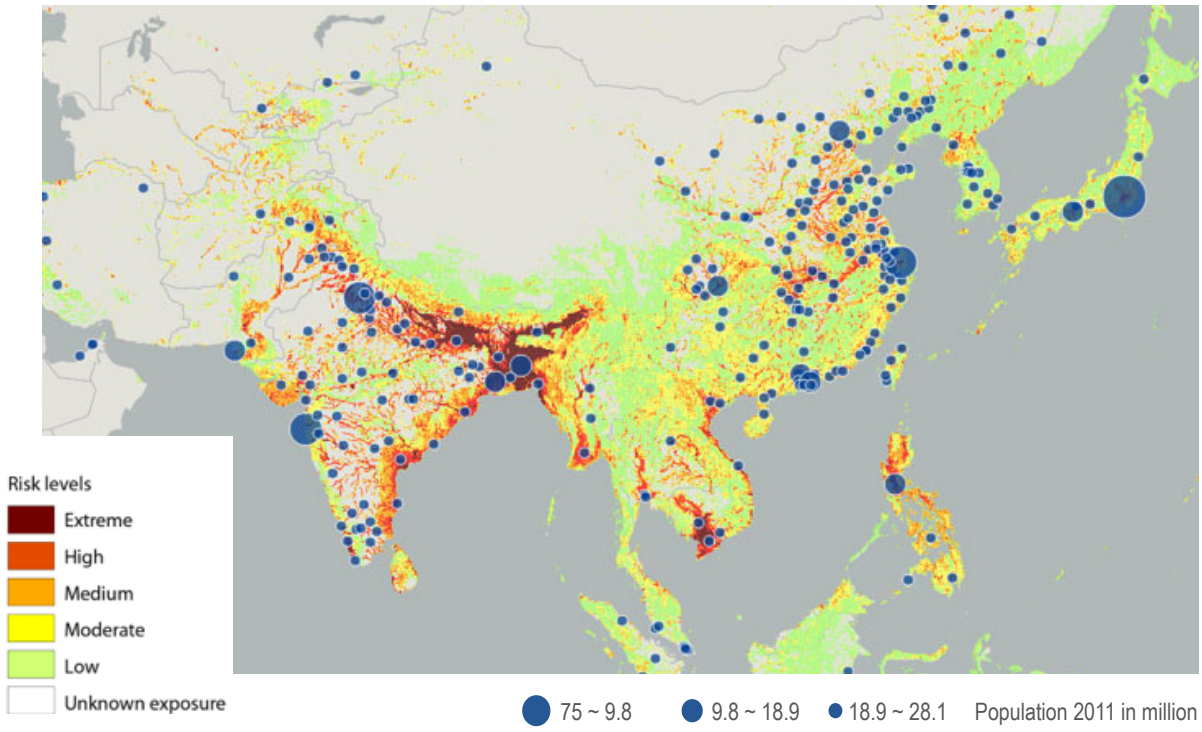
Urban infrastructure is often inadequate and needs to be retrofitted to withstand the impacts of hazards and climate change. According to the Organization of Economic Co-operation and Development (OECD 2007), governments will have to spend approximately US$ 71 trillion by 2030 to provide adequate infrastructure for electricity, road and rail transport, telecommunications, and water across the globe, including in developed countries in order to sustain urbanization and population growth. Investments in infrastructure in most developing economies are insufficient to maintain their quality requiring the private sector to invest and enter into public-private partnerships.

Substandard building is another major risk driver. Local governments often do not have the resources to enforce building codes and standards, and to issue permits in a timely and cost-efficient manner; this situation has contributed to widespread illegal housing construction. In a recent study by UNISDR and CUDRR+R, only 35% of participating local governments reported having adequate and capable technical staff to update and enforce building codes, even though 46% of them are mandated to have full responsibility to undertake such action in their administrative areas.

Figure 3: Many local governments lack the capacity to carry out their mandate to update and enforce the building code. Credit: UNISDR and CUDRR+R, 2016. Local Government Powers for Disaster Risk Reduction.

Locally and regionally, urban expansion also causes detrimental effects on ecosystems (Srinivas 2013) that further aggravates the magnitude of the impact of hydro-meteorological hazards. Environmental degradation caused by the pressure of urbanization, deforestation or inappropriate agricultural management can lead to increased risk for cities that depend on surrounding and distant ecosystems. Furthermore, climate change is expected not only to affect the intensity and the frequency of extreme climatological and hydro-meteorological events, but also to increase "risks from heat stress, storms, extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea-level rise, and storm surges" in urban areas, especially for those "lacking essential infrastructure and services or living in exposed areas" (IPCC 2014). For instance, the catastrophe modeling firm AIR Worldwide estimates the insured replacement value of coastal properties is expected to increase by 7% per year, which means that the value at risk is forecast to approximately double every decade. Making development risk sensitive is therefore a key priority to ensure that growth of future economic losses is managed.

Urban agglomerations with more than 750,000 inhabitants in 2011 and distribution of potential mortality risk from hydro-meteorological hazards



Data Sources: Potential mortality risk:-UNEP UNISDR, PREVIEW Global Risk Data Platform, cartography UNEP/GRID-Geneva 2012
Urban agglomerations :- Based on Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision and World Urbanization Prospects: The 2009 Revision.
Cartography: Sujit Mohanty, UNISDR

Despite the hazards to which they are exposed, cities also provide opportunities for sustainable development. Cities are often the engines of economic development and host to educational and cultural assets of nations, thus requiring that development goals be made operational by scaling up from the local level. Unfortunately, inadequate resources and authority at local level often results in weak local capacity and governance. The participation of local stakeholder in planning and risk management are necessary in order for disaster risk reduction and resilience building in urban areas to succeed.

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What is a Disaster Resilient City?

Photo: UNISDR

City of Bhubaneswar, India, was recognized for being a role model for preparedness

A Resilient City is one, where:

- There is **strong leadership** and **coordination** and **responsibilities** in disaster risk management are clearly delineated. This includes effective stakeholder engagement, well defined policies and strategies and distribution of tasks, effective lines of communication and mechanisms that facilitate effective risk management.
- The city is **up-to-date on knowledge about hazards.** Risk assessments are routinely prepared as a basis for urban planning and long-term development, including current and future investment decisions that contribute to improved resilience.
- There is an **adequate financial plan** that complements and promotes mechanisms to support resilience activities.
- **Urban planning** is carried out based on up-to-date risk information with a focus on the most vulnerable groups. Realistic and risk compliant **building regulations** are applied and enforced to effectively reduce physical risk.
- **Natural ecosystems** within and around the city's territory are identified, protected and monitored to sustain and safeguard their protective functions as natural buffers.
- All **institutions** relevant to a city's resilience are **strengthened** to have the capabilities they need to execute their roles.
- The **social connectedness and culture of mutual help** are strengthened through community, education, and multi-media channels of communication.
- There is a strategy to protect, update and maintain critical infrastructure to ensure that services continue and to increase resilience against hazards and the impacts of climate change.
- **Effective disaster response** is ensured by creating and regularly updating preparedness plans, connecting to early warning systems and increasing emergency and management capacities through public preparedness drills.
- **Post-disaster recovery, rehabilitation, and reconstruction strategies** are aligned with long term planning and provide an improved city environment after disaster events.

Read more
unisdr.org

The Sendai Framework for Disaster Risk Reduction 2015-2030

The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by UN Member States on 18 March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Miyagi Prefecture, Japan. It is the first major agreement of the 2030 development agenda, and aims for "the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries."

The Four Priorities for Action

Priority 1. Understanding disaster risk:
Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.

Priority 2. Strengthening disaster risk governance to manage disaster risk:
Disaster risk governance at the national, regional and global levels is very important for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It fosters collaboration and partnership.

Priority 3. Investing in disaster risk reduction for resilience:
Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment.

Priority 4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction:
The growth of disaster risk means that there is a need to strengthen disaster preparedness for response, take action in the anticipation of events, and ensure capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase is a critical opportunity to build back better, including through the integrating of disaster risk reduction into development measures.
Read more: www.unisdr.org/we/coordinate/sendai-framework

The goal of the Sendai Framework is to be reached through achieving seven global targets for reducing disaster losses guided by four priorities for action.

The Seven Targets of the Sendai Framework for Disaster Risk Reduction

Target a
Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015.

Target b
Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015.

Target c
Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.

Target d
Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.

Target e
Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.

Target f
Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030.

Target g
Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

Read more: www.unisdr.org/we/coordinate/sendai-framework

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CHAPTER 1

Why Invest in Disaster Risk Reduction?

Photo Jeff Hock, http://www.jeffhock.com/gallery/04_12c/DSCN0012.jpg

'Being resilient is a competitive advantage,' says Jayne MacDougall, Director of Risk Management and Loss Prevention, Le Meridien, Phuket Beach Resort. For more information, please see: www.unisdr.org/archive/41654.

Investing in Resilience is an Opportunity for Sustainable Development

The 2030 Sustainable Development Agenda including the Sendai Framework, the Sustainable Development Goals, the Addis Ababa Action Agenda, the Paris Agreement on climate change, and the New Urban Agenda all recognize the important role cities and local governments play in development. As the UN Secretary-General, Mr. Ban Ki Moon, stated in 2016, " All investments in sustainable development should be risk-informed." Disasters cause an annual US$ 314 billion losses in the built environment alone, "setting back development gains in affected countries and hampering the prospect of achieving Sustainable Development." Climate change is expected to drive these losses even higher in the coming decades.

The successful implementation of the 2030 Sustainable Development Agenda will greatly depend on the engagement of cities and urban communities. Risk reduction must be an integral part of local development. Investing in risk reduction and resilience building will safeguard sustainable development and economic continuity of urban communities, and also lead to greater trust by public and private investors in government institutions. Holistic disaster risk management becomes even more attractive when it simultaneously addresses the needs of many stakeholders and their competing priorities. In general, the incentives for disaster risk management are stronger when it visibly contributes to improved economic and social well-being. Frequent small and medium-impact disasters and single intense events can severely disrupt communities and livelihoods. Risk reduction requires a long-term view with strong political commitment.

Ebru Gencer (CUDRR+R and UPAG)

Salford Quays, Greater Manchester, England

Benefits of Investing in Disaster Risk Reduction and Resilience

There are many reasons for mayors and local government leaders to prioritize resilience as part of their political and sustainable development agenda for their communities. Risk reduction and resilience building save lives, enhance social and economic development, and provide equitable, prosperous and sustainable urban development. The gains include:

The Assembly of the East African Community (EAC), a regional intergovernmental organisation that groups Burundi, Kenya, Rwanda, South Sudan, United Republic of Tanzania and Uganda, in March 2016 passed a Disaster Risk Reduction and Management Bill, which is the first such regional legislation in Africa. The EAC act calls for a "legal framework for the intervention and assistance for people affected by climate change and natural related hazards and to protect the natural environment through integration of comprehensive disaster risk reduction and management practices in the East African Region." It provides for establishing a ministerial-level East African Community Disaster Risk Reduction and Management Authority, with clearly stipulated functions and encourages compliance with the Bill by taking appropriate measures such as adoption of laws and regulations and administrative actions and enforcement measures.

A Legacy of Leadership

- Strengthened trust in and legitimacy of local political structures and authority.
- Better opportunities for decentralized competencies and optimization of resources
- Up-to-date conformity with international standards and practices.

Social and Human Gains

- Substantial reduction in fatalities and serious injuries, as well as in damaged properties.
- Active citizen participation and a platform for local development.
- Protected community assets and cultural heritage, with appropriate allocation of city resources for disaster response and recovery.

Sustained Economic Growth and Job Creation

- Positive assurance for investors to anticipate reduced disaster losses, leading to increased private investment in homes, buildings and other properties that comply with building and safety standards.
- Increased capital investment in infrastructure, including retrofitting, renovation and renewal.
- Increased tax base, business opportunities, economic growth and employment as safer, better-governed cities attract more investment.

An online survey conducted by UNISDR in 2013, involving more than 5,000 persons with disabilities from 137 countries, found that only 10% of respondents believe that their local government has emergency, disaster management or risk reduction plans that address their access and functional needs, and only 20% reported that they can independently evacuate immediately without difficulty in the event of a sudden disaster. 51% of respondents expressed a desire to participate in community disaster risk reduction processes.

Cost-effective approaches in disaster risk reduction not only save lives and secure livelihoods but save money against economic risk. For instance, the Rio de Janeiro flood reconstruction and prevention project in Brazil yielded an internal rate of return exceeding 50%; the disaster mitigation and preparedness programmes in Andhra Pradesh, India yielded a cost/benefit ratio of 13.38; and a mangrove-planting project in Vietnam aimed at protecting coastal populations from typhoons and storms yielded an estimated cost/benefit ratio of 52 over the period 1994 to 2001.

More Livable Communities

- Balanced ecosystems that foster environmental services such as availability of fresh water, less pollution, and food security.
- Improved education in safer schools.
- Improved health and well-being.

Interconnected Cities with National and International Expertise and Resources

- Growing access to an expanding network of cities and partners committed to disaster resilience through the campaign to share good practices, tools and expertise.
- An expanded knowledge base and better-informed city planning.

Examples

Odisha, India: Investment in Risk Reduction Pays Off

Cyclone Phalin struck the coast of the Indian State of Odisha in October 2013, affecting more than 13 million people and necessitating the evacuation of one million residents. The cyclone damaged 420,000 homes and the estimated cost of damage was $US 700 million. According to a leading urban activist based in the State capital of Bhubaneswar, this figure would have been higher if it was not for Odisha's strong disaster management record that continues to develop policy, technical and institutional capacities and mechanisms for disaster risk management through a disaster risk reduction perspective.

Dr. Piyush Ranjan Rout, the co-founder and executive director of the Local Governments Network and an advocate for the Making Cities Resilient Campaign, stated that the capital's focus on accountability and disaster risk reduction avoided an even worse outcome: "Most of our towns are part of the UNISDR Campaign and the successful management of [Cyclone] Phalin highlighted the effectiveness of investments made over the last ten years. However, the still exorbitant economic losses experienced indicate strongly that in the future, both the national and state governments have to focus more on reducing economic exposure."

Included in the cost of recovery are US$ 39 million for the repair of 5,825 damaged schools and improvement of other education facilities. The State government announced that the funds would be provided for repair and restoration of school and college buildings based on priority.

Photo by Kent Truog for Catholic Relief Services

Rebuilding after Cyclone Phailin

Stepanavan, Armenia: City Resilience Plan, a Catalyst for Change

The government of Armenia puts high priority on disaster risk reduction, particularly in finding ways to improve disaster resilience at the local level.

Stepanavan, one of the country's most earthquake-prone cities, was badly damaged in the 1988 Spitak 6.8 magnitude earthquake that left 25,000 dead and 500,000 homeless and affected almost 1,000 buildings. The Spitak earthquake and the growing demand for disaster-resilient development prompted Armenia to undertake a pilot project in Stepanavan with a goal of replicating similar projects in 12 other cities.

Using the Local Government Self-Assessment Tool (LGSAT) provided by the Making Cities Resilient campaign, a City Resilience Task Force was created to assess Stepanavan's disaster resilience. This operation was led by the city Mayor Mikael Gharakeshishyan and his interest in mainstreaming disaster risk reduction and climate change adaptation into the city's broader development plan. "The first big lesson from Spitak was that we needed to work with people so that they are aware of how they can protect themselves," said the DRR Focal Point for Armenia, Nikolay Grigoryan. "Take myself as an example at the time. I was so unaware and experienced great frustration. We had no teachers, no textbooks. Experience was our great teacher but it charged us a lot in terms of the cost we paid. We did everything by gut feeling. Now we know that those who have skills and knowledge have more resilience."

Stepanavan was able to identify gaps in its management capacities and develop a detailed City Resilience Action Plan based on the LGSAT assessment results. The Plan was created at a workshop convened by the UNISDR Global Education and Training Institute (GETI) and later mainstreamed into the citywide development plan. After presenting the plan to donors, Stepanavan received funding support from the national government as well as four agencies already working in Armenia - UNDP, UNOCHA, World Vision, and the Armenian Red Cross.

Devastation from the earthquake that hit the city of Spitak in 1988 left 25,000 dead and 500,000 homeless and affected almost 1,000 buildings.

An Opportunity to Strengthen Communities

Disaster risk reduction provides an unique opportunity to strengthen communities. Local governments must lead risk reduction and resilience building efforts within cities, supported with multistakeholder participation. Multistakeholder participation in DRR and resilience building will not only help identify vulnerabilities, risk factors and priorities, but enables the community to be empowered and gain ownership. Participation will help strengthen communities while different stakeholders get involved in risk reduction activities.

Citizen groups in risk-prone areas, including informal settlements, local business and other groups should participate in risk assessment and share their findings with one another. Cities should work with national and local research institutes and hazard monitoring centers and encourage them to contribute to documenting and assessing past and potential hazards and risk scenarios. In this manner, the best options and strategies to achieve risk reduction may be identified. These institutions should be part of a coordination mechanism to deal with disaster risk reduction. Local governments and national authorities must also coordinate with each other to apply and adapt national policies and legislation to local conditions. However, local governments should have the necessary legal and institutional structures that shall enable them to undertake DRR and resilience building activities.

Sustainable Development and Disaster Risk Reduction is a Team Effort

- Local government takes the lead, convenes other actors, regulates and monitors progress.
- Sectors (education, health, transport, environment, etc.) that integrate risk reduction as part of plans and responsibilities, contribute information, and implement activities.
- Academic institutions including research centers that provide research capacity, data analysis and knowledge, participate.
- Citizens and community groups that include indigenous communities and other vulnerable populations who participate share and exchange knowledge, and take individual responsibilities.
- Private sector/business community needs to comply with safety regulations and contribute to the community with know-how and business continuity.
- Professional groups include chartered surveyors, engineers, architects, and planners that provide technical expertise on the built environment; and social workers, teachers and others that organize, raise awareness, collect data, inform the media, etc.
- Civil society includes non-governmental organizations (community-based, faith-based, voluntary, etc.) that participate, organize communities, coordinate, help oversee, and monitor.
- National government authorities and parliamentarians support decentralized capacities with resources, policy and enabling legislation.
- International organizations provide technical cooperation, capacity development, resources, and platforms for dialogue.

Examples

Sao Paulo, Brazil: Bottom-up Resilience for Brazilian Cities

The State of Sao Paulo was the first State in Brazil to join the Making Cities Resilient Campaign. Jonas Donizete, Sao Paulo's Mayor of the City of Campinas stated: "Being part of the Campaign makes us feel both proud and challenged and we have advanced significantly in the development of resilience policies and practices at the city level."

Many cities in Brazil have been motivated to join the Campaign through the "Green-Blue Municipalities" programme. This empowers municipalities to develop and implement a strategic environmental plan in line with local policies and agendas. The program certifies municipalities that have demonstrated performance in several areas such as biodiversity, air quality, environmental education, and water management. These are all key to urban development and resilience. In 2014, Sao Paulo added an additional requirement for certification, that is, municipalities must participate in the Making Cities Resilient Campaign. Cities that demonstrate progress receive capacity-building training, and equipment and resources from a State-level fund that supplements resources to implement disaster risk reduction plans and activities. As of October 2016, 905 cities in Brazil have participated in the Campaign.

Read more at: www.ambiente.sp.gov.br/site/ (Portuguese only).

Photo: UNISDR

Colonel José Roberto Rodrigues de Oliveira, Coordinator of the São Paulo State Civil Defense received from UNISDR David Stevens the Certificate of Completion of the LGSAT (Local Government Self-Assessment Tool) report for the second cycle.

Potenza, Italy: A Role Model for Inclusive Resilience

Potenza Province with a population of 380,000 is an earthquake-prone region in Italy. The UN Office for Disaster Risk Reduction has recognized the Province of Potenza as a role model for inclusive resilience for its unique network of 100 cities enrolled in the Making Cities Resilient Campaign. Through open dialogues with the community and major groups, Potenza aims to raise awareness and share knowledge so that communities can be fully engaged in the decision-making process.

This knowledge forms the foundation of the new Territorial Coordination Plan, or TCP, that recognizes disaster risk reduction (including climate change) and introduces resilient communities to territorial and land use planning. Approved in 2013, the TCP incorporates directives and recommendations on disaster risk mitigation; it consolidates technical and organizational support to local actors, including the private sector and the community to develop and promote actions that lead to resilience.

Under the framework of the TCP, partnerships are established between communities, the private sector and local authorities to reduce risk. These partnerships include analyzing territorial risks, joint planning, and the dissemination of best practices and experiences, including international practices that can be scaled down for implementation at the local level. Potenza's wide-area networking and inclusive approach are key to the success of its local development policies.

Today, Potenza is taking a leading role in the Making Cities Resilient Campaign by guiding all 100 mayors to work together and serving as institutional coordinator for implementation activities. Alessandro Attolico, Executive Director of the Department of Territorial Planning and Civil Protection of Potenza Province has stated: "By offering our support and cooperation in the implementation process, our hope was to convince and involve as many municipalities as we could. Up to now, the positive feedback we received has been quite universal. We can absolutely affirm that the whole provincial territory of Potenza intends to work seriously in this direction by taking advantage also of the strong support and coordination we are offering."

Community participation brings actors together to achieve agreement and commitment on disaster risk reduction (DRR) actions. It allows sharing of information and knowledge, builds trust and transparency and ensures clear and direct commitment to community priorities. Successful local government leaders act on priorities and community needs first, and follow up with commitments in support of DRR agenda.

NOTES

2

CHAPTER 2

The Ten Essentials for Making Cities Disaster Resilient

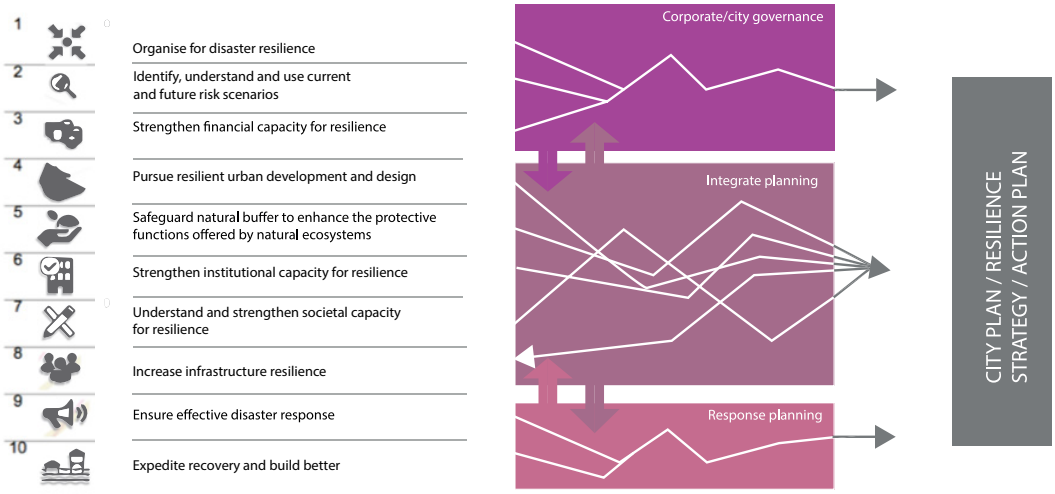
Photo: Evan Leeson.

North Vancouver, Canada incorporated risk reduction criteria into its official community plan, strategic planning, and development permit processes, and has instituted early warning systems for landslides and debris flows

In 2010, the Making Cities Resilient: "My city is getting ready!" Campaign was launched "to support sustainable urban development by promoting resilience activities and increasing local level understandings of risk" (UNISDR 2013, 3). The Campaign was guided by three central themes: to Know More, Invest Wiser, and Build Safer.

These are set out in the "Ten Essentials for Making Cities Resilient," that were developed in line with the Five Priorities of the Hyogo Framework for Action (HFA) 2005-2015. Local governments that sign up with the Campaign, commit to lead the pursuit of risk reduction activities following the Ten Essentials.

In 2015, to support the implementation of the new DRR Framework, the Sendai Framework UNISDR, along with a group of over 100 distinguished city and expert partners has updated the "Ten Essentials." The New "Ten Essentials," building upon the previous set, focuses on initiating advocacy activities towards urban resilience.



The New Ten Essentials seek to cover the many issues that cities need to address in order to become more resilient. While Essentials 1 to 3 are to be accomplished first, the remaining essentials are not intended to be completed in any particular order. The application of the Essentials serves to enable cities to establish a baseline measurement of their current level of disaster resilience under each Essential, to identify priorities for investment and action, and to track their progress in improving disaster resilience over time. Its intention is to guide cities towards optimal resilience, and to challenge complacency, reminding authorities and stakeholders that there is always more to be done to ensure lasting resilience.

This chapter offers a brief overview of the New "Ten Essentials," including the critical and interdependent steps local governments may take to make their cities more disaster resilient. The rationale for each Essential is also explained so that strategic areas of intervention and key actions are better understood.

The Ten Essentials for Making Cities Resilient Checklist

1. Organize for disaster resilience. Put in place an organizational structure with strong leadership and clarity of coordination and responsibilities. Establish Disaster Risk Reduction as a key consideration throughout the City Vision or Strategic Plan.
2. Identify, understand, and use current and future risk scenarios. Maintain up-to-date data on hazards and vulnerabilities. Prepare risk assessments based on participatory processes and use these as the basis for urban development of the city and its long-term goals
3. Strengthen financial capacity for resilience. Prepare a financial plan by understanding and assessing the significant economic impacts of disasters. Identify and develop financial mechanisms to support resilience activities.
4. Pursue resilient urban development and design. Carry out risk-informed urban planning and development based on up-to-date risk assessments with particular focus on vulnerable populations. Apply and enforce realistic, risk compliant building regulations
5. Safeguard natural buffers to enhance the protective functions offered by natural ecosystems. Identify, protect and monitor natural ecosystems within and outside the city geography and enhance their use for risk reduction
6. Strengthen institutional capacity for resilience. Understand institutional capacity for risk reduction including those of governmental organizations; private sector; academia, professional and civil society organizations, to help detect and strengthen gaps in resilience capacity.
7. Understand and strengthen societal capacity for resilience. Identify and strengthen social connectedness and culture of mutual help through community and government initiatives and multimedia channels of communication.
8. Increase infrastructure resilience. Develop a strategy for the protection, and update the maintenance of critical infrastructure. Develop risk mitigating infrastructure where needed.
9. Ensure effective preparedness and disaster response. Create and regularly update preparedness plans, connect with early warning systems and increase emergency and management capacities. 10. After any disaster, ensure that the needs of the affected population are placed at the center of reconstruction, with support for them and their community organizations to design and help implement responses, including rebuilding homes and livelihoods.
10. Expedite recovery and build back better. Establish post-disaster recovery, rehabilitation, and reconstruction strategies that are aligned with long-term planning and providing an improved city environment.

Essential 1: Organize for Disaster Resilience

" Put in place an organizational structure with strong leadership and clarity of coordination and responsibilities. Establish Disaster Risk Reduction as a key consideration throughout the City Vision or Strategic Plan."

Establish necessary strategies, acts, laws, codes or integrate resilience qualities into existing policies aimed at preventing the creation of risk and reduction of existing risk.

Photo: UNISDR

A signing ceremony held in Lami, Fiji on 8th March 2011,Special Administrator Suva/Lami Mr. Chandu Umaria signed Lami's Certificate of Commitment to Disaster Resilience for the 2010-2011 World Disaster Risk Reduction Campaign "Making Cities Resilient." Lami is the first Pacific island city to join the global campaign.

Why?

Having organizational structure and clear procedures in place to respond to the key issues that affect urban resilience to natural hazards is imperative. Developing an organizational structure means strong leadership, clear delineation of responsibilities and coordination mechanisms, effective stakeholder engagement information dissemination and lines of communication, and well-defined risk reduction risk reduction strategies and policies and mechanisms for risk reduction.

How?

Establish Disaster Risk Reduction as a key consideration throughout the City Vision and/or Strategic Plan for the purpose of safeguarding development goals.

- Utilize risk analyses to inform the City Vision/Strategy.
- Develop the City Vision/Strategy through inclusive, participatory multi-stakeholder consultation.
- Review the City Vision/Strategy on a regular basis and adjust timeframes, at least once every five (5) years or as circumstances change.

Make sure that the city has the necessary authority and resources to satisfy local DRR requirements.

- Arrange for lead agencies to have the relevant authority and resources to coordinate local DRR activities, to take decisions in emergencies, and to undertake appropriate measures to mitigate hazards.

Define responsibilities of agencies for various aspects of disaster resilience within the city. This may include one or more agencies depending on the type of hazard or incident.

- Designate clear roles for agencies responsible for leading emergency response and other aspects of pre-disaster mitigation and preparedness hazard scenarios.
- Prepare key stakeholders with responsibility for resilience to gain access to risk information in order to make the appropriate decisions and responses during

various stages of the disaster risk reduction cycle (e.g. mitigation, response, recovery).

Develop a mechanism that prioritizes resources towards effectively lowering those risks that local assessments have identified as significant.

- Ensure that city investments are sufficiently influenced by findings from risk analyses in order that high risks are appropriately addressed.
- Evaluate city investments and initiatives for disaster resilience in terms of benefits and impairments.
- Develop urban development standards to define levels of risk for decision making.

Examples

Batticaloa, Sri Lanka: Disaster Risk Reduction for Municipal Council

Since joining the 'Making Cities Resilient: "My city es getting ready!" Campaign, Batticaloa's municipal council has taken several initiatives to reduce risk in the city. Among them is the establishment of a Disaster Risk Reduction Unit with the support of Australia as part of a project called, "Disaster Resilient City Development Strategies for Sri Lankan Cities." This is aimed at creating sustainable, disaster resilient and healthy cities and townships in disaster prone regions of Sri Lanka.

The project was implemented by UN-Habitat in collaboration with the University of Moratuwa, the Ministry of Disaster Management, the Urban Development Authority and the Local Authorities of the selected cities. The creation of a disaster risk reduction unit within the Batticaloa municipal council was a key milestone in the process of resilience-building.

The DRR unit is responsible for:

- Implementing the Batticaloa Disaster Preparedness Plan
- Supervising and monitoring project implementation in consultation with the Technical Working Group established by the project
- Raising community awareness and providing access to information on disaster resilient technologies
- Providing guidance on DRR procedures to be adapted by relevant institutions

Photo: Sudath Silva

Southern and Western Provincial Council in Sri Lanka organized a workshop to improve construction and planning measures in order to increase disaster resilience

Aceh, Indonesia: Building Local Alliances in Post-Disaster Reconstruction

Aceh Province in Indonesia was ravaged by the Indian Ocean tsunami in 2004. The level of devastation was beyond the scope and capacity of the existing disaster management agency. This led to the establishment of an ad-hoc body at the ministerial level, The Rehabilitation and Reconstruction Agency for Aceh Nias (BRR); thus became responsible for leading post-disaster reconstruction initiatives.

Creating partnerships between communities, the private sector, and local authorities was acknowledged as a top priority for sustainable reconstruction and in order to develop a sense of ownership among the partners. Consequently, the local community and civil society were involved in all phases of the reconstruction process from planning to project implementation. Local officials and public figures were invited to provide commentary and advice. At the implementation stage, local personnel constituted the majority of the BRR staff. Whenever possible, local companies were also given priority in the tendering process and encouraged to create joint ventures with larger national companies. A joint secretariat at the regional level included representatives from the local governments in order to improve coordination and accelerate the reconstruction process.

Photo: AusAID

Building back better after the 2004 Tsunami. Aceh, Indonesia, 2005.

Santa Tecla, El Salvador: Disaster Risk Reduction a Permanent Priority for Local Government

The municipality of Santa Tecla, El Salvador was one of the hardest hit cities by the January 13, 2001 earthquake. Approximately 700 of the 1,200 deaths from the 2001 earthquake in El Salvador was recorded in Santa Tecla due to a landslide that buried more than half the homes in the Las Colinas neighborhood. Since then, the municipal government has made adjustments to land use regulations, environmental protection measures, existing norms and response plans to strengthen institutional and human capacities. In Santa Tecla, reducing disaster risk has become an integral objective of environment-related policies and plans.

Santa Tecla's Strategic Policy for Disaster Risk Management has become an essential component of the municipality's sustainable development strategy by restricting the use of land in flood-prone areas and mass population movements. As a result of these changes, there were no recorded fatalities or damage to public infrastructure and housing during the tropical depression associated with Hurricane Ida in 2009 and 12-E in 2011. The municipal ordinance states that 1.5% of municipal revenue must be dedicated to disaster risk management.This rule, however, shall not reduce the funding already earmarked for disaster preparedness, response and recovery. (Read more at: http://santatecla.gob.sv/)

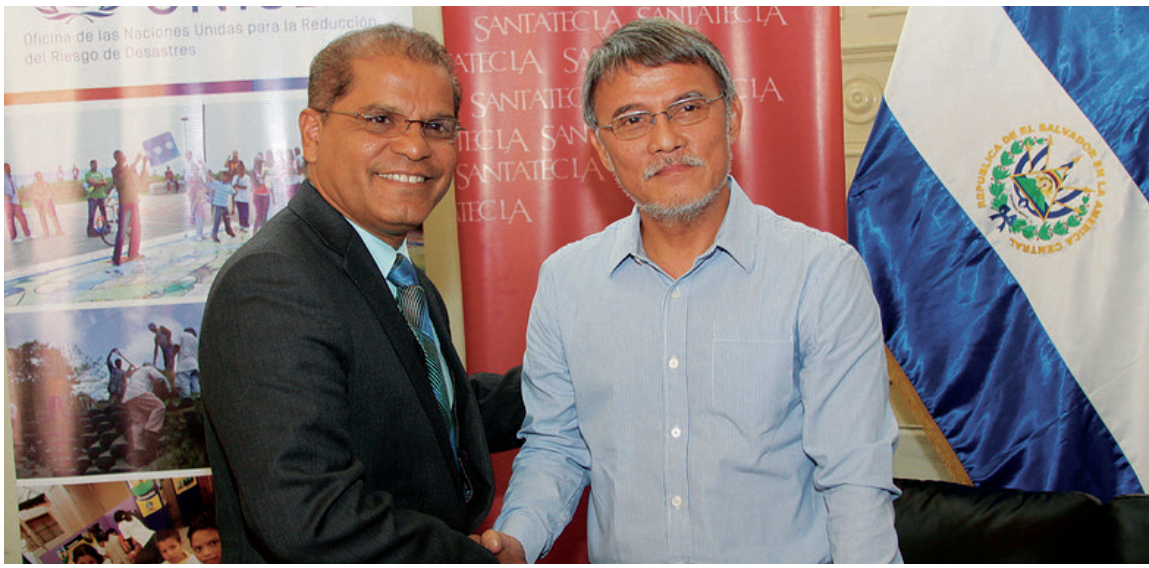


Photo: UNISDR – Resilience Road Trip

Former Mayor of Santa Tecla and UNISDR Champion Oscar Órtiz with former Mayor of San Francisco Cebú, Philippines and UNISDR Champion, Al Arquillano sharing best practices in Santa Tecla.

Essential 2: Identify, Understand and Use Current and Future Risk Scenarios

"Maintain up-to-date data on hazards and vulnerabilities. Prepare risk assessments based on participatory processes and use these as the basis for urban development and long-term planning goals."

Why?

Identifying probable and worst case risk scenarios based on the understanding of multiple and changing hazards, geographical and economic exposure, and vulnerabilities can inform current and future investment decisions that will contribute to improved resilience.

Risk assessments should be communicated and used for decision-making purposes and for the response and recovery plans.

Photo: UNISDR

How?

Undertake technical and multi-stakeholder analysis of current and future threats and hazards to identify city-wide exposure and vulnerability.

- Identify the hazards that the city is prone to and carry out hazard assessments.
- Include into risk assessments all identified hazards and cascading effects, taking into consideration trans-boundary risks.
- Regularly update risk assessments through multi-stakeholder engagements.
- Consider the impacts of climate change in risk assessments for urban development changes and future risk level.

Integrate exposure and vulnerability information into the city's long-term planning.

- Develop clear mechanisms so that risks and their impacts can be integrated into decision making across all city departments for their planning and strategies processes.
- Make readily accessible all risk assessments across departments and key institutional collaborators.
- Form a regularly updated data platform that is accessible to stakeholders and the wider population for the exchange of risk related information.
- Make information on hazard and risk accessible to the public.

Learn from the experiences of cities with similar risk profiles.

- Learn from past disasters to develop relevant programmes to increase resilience.

Examples

Community Risk Mapping in Rimac District, Lima, Peru

In Rimac District of Lima, Peru, a strategic and participatory disaster risk reduction and resilience building process was initiated by the Municipality of Rimac, led by Mayor Kike Peramás. Rimac, participating in the Campaign developed strategic plans and actions and was selected as the Municipality of the Month by the UNISDR Regional Office – Las Americas in February 2014. A significant part of the actions undertaken by Rimac was their participatory nature. The community participated in seismic vulnerability training programmes that included community risk mapping, which helps people identify seismic risk factors in their districts. This type of community mapping is not only significant in terms of increasing the capacity of local governments in risk identification, but also makes subsequent risk plans and programmes more implementable as citizens get involved and gain interest.

(Read more at: www.munirimac.gob.pe/portal/servicios/seguridad-ciudadana/sigrid/)

Photo: Municipality of Rimac.

Community Risk-Mapping Activity in Rimac District, Lima, Peru.

Lanzarote, Canary Islands: Sustainable Development Strategy and Local Action Plans

The island of Lanzarote, one of the Canary Islands, is at risk from storms, flooding, and a variety of other natural hazards. After updating an assessment carried out a decade ago, Lanzarote conducted a diagnosis of current vulnerabilities and challenges including climate change and biosphere conservation. This assessment was highly participatory and involved more than 200 people and 33 different sectors. The process sought opportunities to broaden the current focus on sustainability in up to ten areas of work: from energy and waste and water resources, to disaster risk reduction. The results of the assessment served as the basis for preparation of the 2020 Sustainable Development Strategy and eight Local Action Plans, an island-wide plan and one for each of Lanzarote's seven municipalities. From the beginning, it was clear that disaster risk reduction concepts, techniques and methodologies must be an integral part of a sustainable development strategy. Lanzarote's strategy provides a long-term vision with five clear goals and corresponding objectives. The Local Action Plans serve as a road map for executing the strategy. These action plans call for the execution of 371 projects by the end of 2020.

By the end of 2014, 25 projects were carried out and another 73 projects are ongoing. Examples include projects that use new technologies to improve recycling and thereby reduce waste; rainwater harvesting systems; expanding the current capacity of the sanitation network; expanding sources of renewable energy; and controlling erosion and promoting expansion of organic agriculture. Systems were put in place to monitor and gauge how each municipality is advancing.

Regular meetings are held every three months to update plans and measure progress, using a list of local indicators. These initiatives have been successful due to the highly participatory way in which they are carried out and the stakeholders' clear understanding of their role and the importance of their contribution.

(Read more at: https://www.unisdr.org/archive/35685)

Photo: Marcelo Sabanes (Campaign Advocate)

The municipal technical team of Lanzarote, Canary Islands, Spain.

Delgado, El Salvador and Guatemala City, Guatemala: Expanded Perspective on What Constitutes Hazards

During a participatory process to identify geological and hydro-meteorological hazards, the municipalities of Ciudad Delgado in El Salvador and Guatemala City in Guatemala also diagnosed other risk factors related to daily practices among the population and in communities that led to the accumulation of garbage, pollution and poor access to water resources; and crime as a concern. Involving communities in assessing their own risks not only leads to a greater level of ownership of the knowledge generated, but also broadens their perspective regarding factors that contribute to risk. As in the case of many countries in Latin America, and worldwide, natural phenomena are not the only triggers.

Assessments of trans-boundary risks has also enhanced regional cooperation on risk reduction. They have already led to the creation of digital hazard maps to guide risk reduction actions at the community and municipal levels, such as regulations for land use planning by the municipal government or the adoption of community risk mitigation practices, such as garbage collection and small-scale construction projects to channel sewage.

Photo: UNISDR

The Executive Secretariat of the National Coordinator for Disaster Reduction-SE-CONRED in Guatemala declared the International Day for Disaster Reduction Cultural Resiliency Festival in Guatemala at the Plaza de la Constitution. Activities informed the citizens about the risk management work that was taking place in the country.

Understanding Risk and Providing Solutions through Community Workshops: Wellington, New Zealand

To improve the preparedness of Wellington which is at risk from tsunamis, local officials joined the coastal residents of Island Bay as a key partner in the development of a high impact and low cost solution. Over the course of several months of workshops, local residents in the suburbs explored a range of ideas that would help them understand their tsunami risk and prepare them to take action. Many ideas were generated, but one stood out for its simplicity and powerful ability to convey the risk – paint blue lines on the roads that indicate the maximum run-up height of a tsunami. This could be achieved based on existing tsunami inundation maps. The idea of a painted blue line on the road struck a chord with both the locals and

Wellington City Council. Locals and tourists would have a compelling visual aid that would reinforce the urgency of finding areas where they needed to evacuate. It would become a reminder every time someone walked or drove passed it.

Once approved by the city, the working group began preparing residents for the lines through a range of community-led promotional activities. The rollout was met with significant interest within the city and across New Zealand. Many questioned the validity of the modelling done to estimate how high tsunami waves could reach. All doubt was eliminated a month later when the Tohoku earthquake and tsunami struck. Six years on, the Tsunami Blue Lines have not affected house prices but are widely seen as having added value to the coastal suburbs.

The process of Tsunami Blue Lines involves more than just painting roads. From day one, the concept has been about involving affected communities so they gain ownership of the solution. The process for rollout is still done one suburb at a time. In each instance, key stakeholders (schools, locally elected officials, businesses and at-risk groups) are brought together to discuss their particular risks, create a set of promotional activities to help local residents know what they should do in the event of a large earthquake and explore specific activities that might reduce the risk to their community. This has proven a valuable part of the planning process in each suburb. For example, nearly in every school, evacuation planning has been modified. In the suburb of Seatoun, the local school realized they were in the tsunami zone and raised US $25,000 to build an evacuation staircase and platform for their students and neighboring households to ensure they are out of harm's way. This was done in partnership with Wellington City Council. Other schools like Owhiro Bay School have had Blue Line days where all the students dress up in blue and practice a school-wide evacuation.

As a result of the positive impacts, other cities are implementing the lines. Auckland, New Zealand's most populous city, is rolling them out. The coastal state of Oregon has also adopted the concept and has included community-wide evacuation practices. The visual impact of a stenciled blue line across the road marked "tsunami safe zone" has measurably raised tsunami preparedness and improved collaboration between council and community members while simultaneously avoiding signage pollution.

For more information about the Tsunami Blue Line process, contact resilient@wcc.govt.nz

Photo: Wellington Region Emergency Management Office

Essential 3: Strengthen Financial Capacity for Resilience

"Prepare a financial plan by understanding and assessing the significant economic impacts of disasters. Identify and develop financial mechanisms to support resilience activities."

Why?

Understanding the economic impact of disasters and developing financial mechanisms are essential to supporting resilience activities and strengthening opportunities for response and recovery.

Explore, as needed, innovative financing mechanisms such as specialized bonds, specialized insurance, tax efficient finance and others.

In the aftermath of the East Africa drought in 2011, HelpAge started a recovery and resilience-building project in Turkana County with funding from the UK-based Disasters Emergency Committee (DEC). The project gave unconditional cash transfers to 3,000 elderly and their families affected by the drought for a period of five consecutive months, with a one-off conditional livelihoods cash transfer after the five months.

How?

Prepare an adequate financial plan, procedures, and available resources to allow resilience building activities to be realized, including long-term climate adaptation.

- Develop transparent mechanisms for accepting and allocating financial support from various sources.
- Prepare strategies to access funds for response and recovery over the long term.
- Codify a clear process for the management and allocation of funds towards necessary long-term actions in pursuit of resilience.
- Be aware of key economic sectors, assets and risks of the city.
- **Ensure that there are means in place for adequate financial support to protect product vulnerable segments of the city's population.**
- Organize financial assistance mechanisms such as microfinance to address the specific needs and social protections of vulnerable populations.
- Promote insurance coverage and provide incentives for financial support along with other risk transfer mechanisms.
- **Establish a specific budget, the necessary resources, and contingency fund arrangements for local disaster risk reduction (mitigation, prevention, response and recovery).**
- Construct a contingency fund within the city budget that is enforced by policies.
- Assign an annual budget towards prevention measures.

Examples

Turkish Catastrophe Insurance Program (TCIP)

Following the 1999 Marmara Earthquakes, the Turkish Catastrophe Insurance Pool (TCIP) was established with assistance from the World Bank. The objectives of TCIP were to: a) Ensure that all property tax-paying dwellings had earthquake insurance cover; b) Reduce government fiscal exposure to the impact of earthquakes; c) Transfer catastrophe risk to the international reinsurance market; d) Encourage physical risk mitigation through insurance.

The establishment of the TCIP helped the Government of Turkey reduce its contingent liability by promoting domestic property catastrophe insurance for private dwellings. Making it possible for homeowners to purchase insurance, the Government of Turkey increased the number of citizens who would be compensated by the private sector in case of an earthquake. In addition, by making insurance compulsory for middle- and high-income urban households, the Government significantly reduced the number of homeowners likely to require financial assistance after a disaster.

Premium rates were based on the construction type and property location and vary from less than 0.05% for a concrete reinforced house in a low risk zone to 0.605% for a house located in a high risk zone. The policy was distributed by about thirty existing Turkish insurance companies, which receive a commission. The Government invested heavily in insurance awareness campaigns and made earthquake insurance compulsory for home-owners in urban areas. Earthquake insurance is also now compulsory for homeowners seeking mortgages and purchasing an apartment or a house

Photo: Ebru Gencer (CUDRR+R and UPAG)

Dilapidated buildings in Fener District, Istanbul

Central America: Fund Available for Disaster Risk Management

In 2009, Central America marked the 10th anniversary of Hurricane Mitch with a regional forum that established the guidelines for a Central American Policy for Comprehensive Disaster Risk Management (PCGIR) and created the Central American Fund for the Promotion of Disaster Risk Management (FOCEGIR). The Heads of State and Governments of the countries that form the Central American Integration System (SICA) approved FOGECIR in 2011.

FOCEGIR makes funding available for national and regional projects for the implementation of disaster risk reduction plans and activities at all administrative levels, including managing climate change threats and minimizing or avoiding other actions that lead to vulnerability. National civil protection systems in Central America may qualify for funding for projects that are framed by the defining elements of the PCGIR; disaster risk reduction as part of an investment in sustainable economic development, social development and compensation to reduce vulnerability, the environment and climate change, land management and governance, and disaster management and recovery. FOCEGIR seeks to complement its support from the international community with resources already assigned by Central American countries for the implementation of national disaster risk management policies. This milestone initiative makes it possible not only to use funds exclusively for response, but also for risk reduction including risk identification, training, mitigation, and capacity building of local governments. You can read more at: www.unisdr.org/archive/44858

Photo: UNISDR

Regional meeting of Central American Policy for Comprehensive Disaster Risk Management (PCGIR) to discuss the Sendai Framework for Disaster Risk Reduction.

Hyogo Prefecture, Japan: The Great Hanshin-Awaji Earthquake Reconstruction Fund

A substantial amount of flexible budget is required for post-disaster recovery projects; securing such a budget is a major challenge for most nations. The Japanese government's administrative system requires parliamentary decisions to obtain

budgets for projects. As a result, the rapid restoration of a disaster-affected community was a challenge for the Hyogo Prefectural Government that hindered the government's efforts to provide prompt assistance to disaster victims. Furthermore, the single-year-based budget accounting principles imposed constraints on its disaster recovery measures, which take a long-term perspective. In overcoming the above problems, the Great Hanshin-Awaji Earthquake Reconstruction Fund was established in 1995 with the aim of implementing projects on a stable and flexible basis, and to promptly meet the multifaceted needs of disaster victims. A 900-billion-yen fund was raised to support the recovery of disaster-affected areas and by 2007, approximately 360 billion yen was spent on projects to assist in rebuilding communities through housing construction, support to industry, and rehabilitating schools.

In order to maintain the Fund, the Hyogo and the Kobe City governments provided an interest-free grant of 880 billion yen to the Fund. City governments could borrow this money from financial institutions to complement the government's efforts of supporting disaster-affected communities and the national government provided an ordinary local grant tax for them to cover part of the interest. As a result of this initiative, by the end of March 2014, multiple governments were able to implement 116 supporting projects at a value of around 365 billion yen, thereby contributing to the recovery from the Great Hanshin-Awaji Earthquake.

Source: Mr. Murata, M., and Nakatsu, N. 2015. "Hyogo Prefecture, Japan: The Great Hanshin-Awaji Earthquake Reconstruction Fund." Available at: http://wp.preventionweb.net/wcdrr/tag/hyogo-prefectural-government/page/2/

Photo: Ebru Gencer (CUDRR+R and UPAG)

Hyogo, Japan.

ICLEI, Local Governments for Sustainability Programmes

ICLEI, Local Governments for Sustainability is a global network of over 1,500 cities, towns and regions committed to building a sustainable future. It provides resources and support to better position local and subnational governments to access finance and to implement innovative local financing mechanisms for resilience building. Among ICLEI's Finance Programmes are: a): Transformative Actions Program (TAP) that aims to catalyze and improve capital flows to cities, towns and regions to accelerate low-carbon and climate-resilient development; b) Green Public Procurement that

provides guidance and tools to help local governments embed sustainable procurement practices into their day-to-day activities; c) Cities Climate Finance Leadership Alliance (CCFLA), whose mission is to catalyze and accelerate additional capital flows to cities, maximize investment in climate smart infrastructure, and close the investment gap in urban areas over the next fifteen years; and d) Climate-KIC Low Carbon City Lab (Local) provides a platform to accelerate public-private innovation partnerships focused on climate mitigation and adaptation.

You can read more at: http://resilient-cities.iclei.org/resilient-cities-hub-site/about-the-global-forum/

Photo: UNISDR

Global Campaign launch during Resilient Cities 2010 - ICLEI First World Congress on Cities and Adaptation to Climate Change and Mayor's Adaptation Forum from 28-30 May 2010 in Bonn, Germany.

World Bank Services for Supporting Urban Resilience: Development Policy Lending for Belo Horizonte, Brazil

The World Bank group offers a wide range of specialized financing products and services that contribute to urban resilience at the individual/household, community, municipal and national levels. The Bank offers cities and countries a suite of urban resilience financial instruments, advisory services and analytics (ASAs), reimbursable advisory services (RASs) as well as technical assistance. Among the financing approaches that the Bank uses is Development Policy Lending (DPL), which typically provides budget support in recognition of policy and institutional reforms.

In 2013, the World Bank provided a US$ 200 million DPL to the city of Belo Horizonte, Brazil that has a high poverty rate, which is correlated with housing conditions, inequality, access to jobs and gender. The loan was in support of inclusive urban development to reduce vulnerability of the urban poor, promote green and sustainable practices, and enhance socially and fiscally sustainable urban governance. The loan built upon ongoing reforms in housing development, resettlement, social programs, climate change adaptation and mitigation, disaster risk management, and results-based management.

During the loan implementation period, the Municipality adopted ambitious participatory and inclusive decision-making mechanisms to foster direct citizen involvement that helped develop a sense of ownership in matters such as budget allocation, policy decisions, and planning. The city also embraced innovative resettlement policies and practices, in which it designed a specific action plan for those families not reached by existing social programs to their specific needs. Finally, the city developed and implemented a municipal climate change action plan and strengthened its disaster early warning and reporting system.

Source: Adapted from:
GFDRR and WB, 2015. Investing in Urban Resilience: Protecting and Promoting Development in a Changing World. Washington D.C.: World Bank. World Bank, 2015. Brazil-Belo Horizonte Inclusive Urban Development Policy Loan Project. Washington D.C.: World Bank Group.

Asian Development Bank's (ADB) Urban Climate Change Resilience Trust Fund (UCCRTF): Urban Climate Change Resilience (UCCR) Approach in Bangladesh and Pakistan

Asian Development Bank's (ADB's) Urban Climate Change Resilience Trust Fund (UCCRTF) aims to scale up investments in urban climate change resilience (UCCR), especially for the urban poor, across 25 secondary cities in Asia. It prioritizes seven developing member countries (DMCs) of the ADB: Bangladesh, India, Indonesia, Myanmar, Pakistan, Philippines, and Viet Nam. The UCCRTF supports climate change integration into city planning, implementation of both hard (infrastructure) and soft (policy or institutional) interventions, and includes a knowledge component to capture lessons learned to enhance understanding of urban climate change resilience. Through these components, the Trust Fund aims to help cities reduce the risks brought on by rapid urbanization and climate change on their population, particularly the poor and vulnerable. The components of UCCRTF in more detail are: (i) Planning: support for mainstreaming climate change considerations (both impact/adaptation and low carbon objectives) into existing city-wide and sectoral planning processes; (ii) Projects/Investments: technical assistance (TA) to prepare investment projects and also leverage private sector participation in climate resilient infrastructure projects with a view to make them investment-ready; and (iii) Knowledge: funding and support to establish and strengthen knowledge and learning from selected cities, setup peer learning networks through which cities share experiences and lessons globally, and monitoring and evaluation framework and systems for the program.

The UCCRTF supports climate resilient integrated urban planning, project preparation and capacity building of relevant institutions in Bangladesh and Pakistan. The Trust Fund was established in 2014 with funding from the governments of UK, Switzerland and the United States, and the Rockefeller Foundation. While the investments in climate resilience have

to be implemented within the next five years, UCCRTF has focused much of its work on supporting climate resilient urban planning, particularly in Bangladesh and Pakistan, using the Urban Climate Change Resilience (UCCR) approach.
As opposed to the conventional approach of identifying infrastructure investments on the basis of growth center development, the Urban Climate Change Resilience (UCCR) approach involves (i) preparation of climate risks and vulnerabilities assessment (CRVA) at regional and city level; (ii) identification of vulnerable areas and communities; and (iii) climate screening of infrastructure towards the investment in climate resilient infrastructure. It enables municipalities to develop a phased infrastructure investment process that takes into consideration climate resilience vis-a-vis urban development. This approach was applied in Bangladesh and Pakistan. This resulted in the formulation of integrated urban plans that mainstream climate change mitigation and adaptation, which, more importantly, help in the identification and preparation of sub-projects that, in the long run, will contribute to enhancing the towns' resilience to climate change impacts.

Photo: Courtesy of the ADB Photo Library

The number of high rise and modern buildings has been growing in Dhaka thus increasing exposure to physical risks.

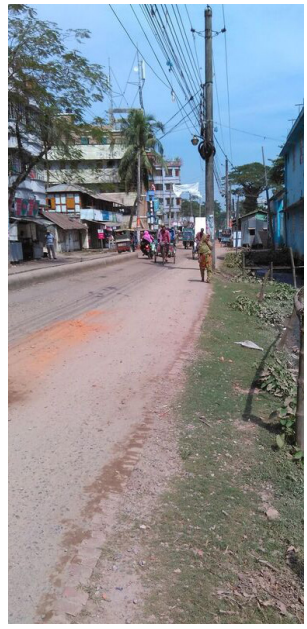


Photo: UCCRTF Secretariat

Open sewage alongside the road in Patuakhali, Bangladesh Figure.

Essential 4: Pursue Resilient Urban Development and Design

"Carry out risk-informed urban planning and development based on up-to-date risk assessments to reduce risks and prevent future ones, while giving particular attention to most vulnerable groups. Apply and enforce realistic, risk compliant building regulations and support relevant professional education and training for implementation."

- Adopt risk-sensitive urban plans, appropriate mechanisms, land-use allocations, and development projects that contribute to the overall increase in resilience of the city with particular consideration for the vulnerable populations. .

- Maximize the use of urban design solutions such as permeable surfaces, green areas, water retention areas, ventilation corridors that can cope with risks including the impacts of climate change.

Why?

Pursuing resilient urban development based on risk-informed urban plans is essential to reducing current disaster risks and the prevention of future ones. Participatory urban planning processes and focus on vulnerable groups will not only decrease risk and facilitate the implementation of urban plans, but will also help in attaining equitable and sustainable development of urban communities.

How?

Regularly update urban plans with most recently obtained risk information (shocks).

- Prepare quality, up-to-date risk and hazard zone maps to inform land use and urban planning decisions.

Include into urban plans any cross-cutting issues related to urban resilience (stresses).

- Prepare urban plans to mitigate local stresses including those related to all critical infrastructure and services.
- Identify, in risk-sensitive urban plans, any mechanisms, land-use allocations, and development projects that contribute to the overall increase in the resilience of the city with particular consideration for the vulnerable populations.

Ensure that there are mechanisms and processes to implement risk-sensitive urban planning.

- Clearly define the roles and responsibilities of actors implementing the urban plan.
- Ensure adequate engagement of and consultation with stakeholder groups in the different stages of planning and implementation.
- Support professional associations and academic organizations pursuing continuing education on risk-informed planning practices.

Photo: Ebru Gencer (CUDRR+R and UPAG)

Doha, Qatar

Ensure that there are mechanisms and processes to implement risk-sensitive urban planning.

- Clearly define the roles and responsibilities of actors implementing the urban plan.
- Ensure adequate engagement of and consultation with stakeholder groups in the different stages of planning and implementation.
- Support professional associations and academic organizations pursuing continuing education on risk-informed planning practices.

Regulate the development, updating, and the enforcement of building codes and standards as applied to relevant hazards and climate change impacts.

- Update building codes to take into account changing data and evidence on risks
- Establish entities to legally enforce construction supervision processes.
- Support local governments, certified NGOs and professional associations, and universities to provide sufficient education and training programs to address risk-sensitive construction and retrofitting.

Examples

Hoboken, New Jersey, USA: Updating Standards and Codes for Urban Flood Management

Superstorm Sandy was one of the largest recorded Atlantic storms, with winds extending over an area of approximately 1,000 square miles. The damage was unprecedented in Hoboken, a city in northern New Jersey directly across the Hudson River from New York City. Nearly 80% of Hoboken was flooded, resulting in more than $100 million in private property damage, more than $10 million in damage to municipal property, and severe degradation of the region's transportation network.

To reduce future impact to critical infrastructure, Hoboken is working to reconcile the city's zoning code with state and federal regulations to allow 'wet flood-proofing' and 'dry flood-proofing' of ground level floors that are located below the base flood elevation (BFE). Currently, usable space on the ground floor of residential and/or mixed-use buildings is prohibited or discouraged if located below the BFE. This impacts not only street life and community character in Hoboken, but also adversely impacts public safety and security. State and federal regulations prohibit or discourage elevator mechanicals from being located anywhere below the BFE. This in turn necessitates the construction of elaborate and excessive handicapped ramps to comply with the Americans with Disabilities Act. For these reasons, the city will update its design standards and zoning ordinances for the governing of storm water management and floodplain protection.

Many of Hoboken's municipal facilities sustained significant damage due to flooding including the fire department headquarters and two fire stations, the public works department central garage, the public library, volunteer ambulance corps, municipal parks and recreational facilities. This experience has led Hoboken to prepare a Municipal Hazard Mitigation Plan and to seek ways to preserve open spaces, and historic and recreational sites. A five-year Capital Improvement Plan focuses on municipal resiliency and hazard mitigation.

Photo:Ebru Gencer (CUDRR+R and UPAG)

Hoboken, New Jersey

Kandy, Sri Lanka: Certification Required in Landslide-prone Areas

Landslides are one of the major hazards in the mountainous and hilly areas of Sri Lanka; improper planning and construction activities further exacerbate the risk. More than 200 families went missing after a massive landslide buried three villages in Sri Lanka following days of torrential rain in May 2016. Recognizing that most landslides are created by human interventions, the Ministry of Disaster Management, and the National Building Research Organisation (NBRO), introduced a landslide clearance requirement for construction in landslide-prone areas of the country. As a result, it is now mandatory to obtain a landslide clearance certificate in the ten districts that the NBRO has declared as most at-risk for landslides.

NBRO is working with the Kandy municipal council to introduce a NBRO clearance certificate scheme before approving any construction projects in the city. The municipal council issues guidelines to complete the application process and once the NBRO receives the application, it investigates and issues the building construction clearance if the area is deemed safe for development or construction. The NBRO has developed landslide-zoning maps for Kandy to display the geographical distribution and severity of impending landslides. Four landslide hazard zones have been identified and a general guideline for development of each zone has been produced. The landslide-zoning map is used in conjunction with the guideline as a decision making tool for development in landslide-prone areas of Sri Lanka.

Photo: UNDP Sri Lanka.

Risk awareness in early childhood education in Sri Lanka, where children learn about drought, flood, landslide and lightning best practices through a game similar to "Snakes and Ladders."

Aqaba, Jordan: Risk Sensitive Land-Use Planning

Land use management has been a challenge in the city of Aqaba, as land for suitable urban development is limited by the city's narrow geographical location, being surrounded by Al Sharah mountains. In addition, the city is exposed to floods and earthquakes, requiring DRR to be well integrated within land use and urban planning. The local government of Aqaba has managed to overcome its limitations turning them into opportunities for both investment, and proper urban development in the city. In 2010, Aqaba adopted the Ten Essentials for city resilience and disaster risk reduction and mainstreaming at the local level. For this, Aqaba has been announced as the first role model city for "Localizing DRR."

Aqaba is currently using this risk-sensitive land use planning process to define the exposed areas as well as the high vulnerable locations. The output of this process will later be used to revise and update Aqaba's 2001-2020 Land Use Master Plan. This model of mainstreaming DRR into the practical land use planning and zoning processes demonstrates urban planning process with a more risk–sensitive approach.

Utilizing all the risk information and building on the risks assessment studies conducted, Aqaba is now able to produce risk and hazard maps for flood and earthquake prone areas, as well as micro-zonation maps that define seismic faults. In addition, building and licensing regulations of Aqaba and construction permits require that all buildings, including schools and hospitals, have been designed in accordance with the seismic codes. The Jordanian Engineers Association reviews the design of these buildings to verify that they comply with the safety standards. Following-up the application of safety procedures remains a challenge during the construction phase. The Aqaba Special Economic Zone Authority (ASEZA) relies on private sector firms to check the compliance of designs to the codes.

By using GIS and satellite images to produce risk and hazards maps, ASEZA has been able to share and communicate the risk among its partners especially the private sector to ensure all have a common understanding and acceptance of the known risks. This actually allowed for a stronger partnership with the private sector making it possible to implement DRR activities involving structural protection and mitigation measures such as dams and flooding channels at prone areas.

Photo:Aqaba Municipality, Jordan

Aqaba Master Plan Vision

Essential 5: Safeguard Natural Buffers to Enhance the Protective Functions Offered by Natural Ecosystems

"Identify, protect and monitor natural ecosystems within and outside the city geography to sustain and safeguard their protective functions as natural buffers and enhance their use for risk reduction."

Consider natural buffers in the rural hinterland of the city and the wider region, and take a regional resilience approach, that is, resilience building through trans-boundary cooperation with other municipalities.

Photo: Jocelyn Carlin (Panos / Oxfam International)

While being least responsible for global greenhouse gas emissions, Small Island Developing States, such as Kiribati, find themselves on the frontlines of climate change. Local risk reduction actions, such as using coral rocks to build temporary walls to break the swell of increasingly large king tides, is one example of communities acting to reduce their vulnerability. Kiribati is one of the world's least developed countries and has a limited capacity for adaptation.

Why?

Identifying, protecting and monitoring natural ecosystems within and outside the city is imperative so that their protective functions as natural buffers are sustained and safeguarded Ecosystems and their services not only support city functions, such as water provision, but can also reduce risks from hazards and impacts of climate change. Together with ecosystems, green and blue infrastructure within urban areas have the potential to reduce risks from climatological as well as hydro-meteorological hazards.

How?

Develop solutions to address current and future environmental risks such as maintenance of green and blue infrastructure through nature-based solutions or protection of the ecosystems.

- Integrate the protection and restoration of ecosystems into the city strategy and urban development plans.
- Identify and maintain ecosystem services that contribute to hazard mitigation.
- Be aware of the roles and beneficial functions of green and blue infrastructure and nature-based solutions to risks in the city and the extent that they are integrated in city plans and strategies.Generate wider action and more resources by encouraging surveyors, engineers and other built environment professionals, the private sector and communities to participate in this critical risk reduction work.

Protect and restore ecosystems to the extent that they offer sufficient adaptation and mitigation benefits to current and future risks.

- Maintain legal and policy mechanisms to ensure the preservation and restoration of land that supports biodiversity and critical ecosystem services, including productive land.

- Establish trans-boundary agreements and collaboration mechanisms to enable policy and planning for the implementation of ecosystem-based approaches.

- Generate wider action and more resources by encouraging surveyors, engineers and other built environment professions, the private sector and communities to participate in critical risk reduction work.

Photo: Arantxa Cedillo / UNDP Cambodia

Simple technologies can save lives and livelihoods. Tree planting, whether it be coconuts or other deep rooted species, has multiple benefits, such as reducing damage associated with floods and high winds. It can also help to restore ecological balance, maintain biological diversity and stabilize soil. In addition, many communities can derive income from managing forests. Six year old, Van Lyna plants a small tree on "Green Day" in Prey Veng Province in South-East Cambodia.

Examples

Béguédo, Burkina Faso: Seeking Alternatives to Traditional Livelihoods Brings Environmental Security

The Nakambé River passes from north to south through the rural municipality of Béguédo, Burkina Faso (population of approximately 23,000). It is one of the country's largest rivers and an important source of water for agricultural and fishing activities. The banks of the Nakambé River are the heart of economic and business activities in Béguédo and attract many people. However, these activities also contribute to the degradation of the river banks, and are considered major threats to the river's survival.

The combined effects of climate change and other anthropogenic factors also are responsible for accelerating the degradation of land in Béguédo, such as overgrazing, and exploitation of forest resources, fish and wildlife as residents pursue traditional socio-economic activities. Concerned that these will hamper sustainable human development, Béguédo is strengthening and protecting its ecosystems and natural buffers to make them more resilient to natural hazards. The municipality is taking action through good governance of natural resources; adapting to climate change by implementing best practices, such as mapping the protected areas, and working with the community to show how they can improve their livelihoods while, at the same time reducing disaster risk.

A major constraint to halting further degradation of the river banks is the difficulty of relocating producers who grow their crops along the shoreline. Initial efforts have met with limited success due to budgetary restrictions, but landowners have now been identified and the municipality has provided them with seedlings as an incentive to relocate to a place that will allow for better protection of the ecosystem.

Photo: Sarah Oughton (IFRC)

By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change. In some countries, yields from rain-fed agriculture could be reduced by up to 50 %. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition. Burkina Faso, in the Sahel, has been hit hard by erratic rains resulting in poor harvests, little pasture for livestock and little resources to buy food in the market where the price of a bag of millet has more than doubled. Food vouchers, distributed by organizations such as the Burkinabe Red Cross, allow beneficiaries to procure essential items from local traders.

Lanzarote, Canary Islands: A UNESCO Biosphere Reserve

Tourism is Lanzarote's principal economic activity. With a permanent population of only 150,000, Lanzarote receives approximately two million visitors a year, many of whom come to enjoy the island's rich natural heritage. The island government, together with the Tourism Board and the Biosphere Reserve, is working to make tourism sustainable. For example, one municipality that is home to a natural park is working to reduce private car access to the park by developing a project to replace the cars with bikes and/or an electric bus system, thus lessening impact on the environment and promoting natural resources management.

More than 20 years ago, UNESCO recognized the entire island of Lanzarote as a Biosphere Reserve. Lanzarote's Biosphere Reserve Office has retained an active role in managing environmental issues on the island, gradually increasing collaboration with a variety of sectors as part of the long-term process of sustainability. Due to heightened public awareness and the commitment of island authorities, conservation measures have been put in place to protect the island, 40% of which is protected under the Natural Protected Spaces Law. As an example, a zonation plan regulates land use, curbing excessive urban and tourist developments, thereby helping to manage and use natural resources efficiently. Lanzarote is taking steps to receive certification as a Sustainable Tourism Destination, in recognition of its increasing popularity as a high-quality destination for a range of sporting activities, including cycling, hiking, sailing, surfing and other water sports.

Read more about Lanzarote's Biosphere Reserve Action Plan at: www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/europe-north-america/spain/lanzarote/

Photo: Danielle Bellucci

Cliffs of Lanzarote, North Coast.

Essential 6: Strengthen Institutional Capacity for Resilience

"Strengthen all institutions related to a city's resilience to have the capabilities to execute their roles and increase city's resilience. Understand institutional capacity to help detect and strengthen gaps in resilience capacity"

▶ Develop an understanding of roles and responsibilities, and a framework of shared and open information on resilience.

Why?

Multiple organizations and stakeholders in a city have roles to play to reduce risk and increase their resilience. Strengthening institutional capacities including, but not limited to that of governmental organizations, private sector providing public services, industries, academic, professional and civil society organizations) will increase the city's resilience as a whole.

Photo: UNISDR.

Local Emergency Assessment Response Network (LEARN) is situated at an important interface of the Indonesian DRM structure - closing the gap between the local disaster management entities (BPBD), NGOs on the ground, community organizations and, most importantly, affected communities. DRR efforts, still, are often too far from the grassroots level.

How?

Legitimize disaster resilience roles and responsibilities in DRR legislation.

- Maintain the city-wide implementation of DRR legislation.

Ensure that processes are in place to strengthen and share the knowledge and skills of the stakeholders involved in disaster resilience.

- Support institutions that provide relevant training to staff and individuals to improve their skills set and education.
- Clearly define in the city DRR plans, stakeholder qualities, such as competencies, capabilities and resource capacities that they possess.
- Facilitate a standard process to capture, store and share relevant data across institutions that help to overcome knowledge gaps and barriers to building resilience.
- Actively engage in national and international networks for knowledge sharing.

Maintain processes to facilitate top-down and bottom-up communication that strengthens the knowledge and awareness of the general public.

- Cultivate reporting mechanisms that promote transparency and accountability across all sectors.
- Maintain risk data that is easily accessible and share it with other organizations and citizens.
- Ensure that all communities and citizens can communicate with disaster responders by facilitating the flow of emergency information.

Utilize the capacity of the private sector and civil society for DRR

- Ensure that the DRR stakeholders work effectively with private sectors.
- Ensure that the DRR stakeholders work effectively with civil society.

Photo: UNISDR

First Arab Conference on Disaster Risk Reduction (DRR) brought together the key actors in DRR from the 22 Arab countries in March 2013 in Aqaba, Jordan

Examples

Bugaba, Panamá: Workshop to Link Existing Decentralization Law with the New Ten Essentials

The Municipality of Bugaba, Panama, undertook a workshop in order to link the Decentralization Law of Panama with the New Ten Essentials, bringing together legal advisers from various municipalities of the country, representatives of judges, government institutions, members of the Association of Municipalities of Panama - AMUPA and the National Secretariat for Decentralization. The methodology of the workshop included presentations and roundtables where participants debated the relevant legal instruments and their relationship to the New Ten Essentials, allowing them to identify strengths, weaknesses and viable options and alternatives. A document that emerged from the meeting would support the management of municipalities in Panama to build resilience.

This workshop had been a very useful initiative for Bugaba and other municipalities in Panama; it was a pioneering action that brought to the fore the new decentralization law, which had just come into force and had given new powers to local governments. In the workshop, the stakeholders could identify elements of the law that could contribute to compliance with the Sendai Framework and the Ten Essentials of the Making Cities Resilient Campaign.

The Decentralization Law signifies disaster risk reduction as an essential component of sustainable development. Indeed, the Law can really help in DRR, as it goes beyond thinking about disasters solely, but includes working on risk management and resilience, which are related to all areas of development.

Photo: Alberto Pascual

Bugaba, Panama.

Latin America: Grassroots women and local authorities are trained in DRR

Grassroots women's groups from communities in Guatemala, Honduras, and Nicaragua are using a participatory model called the 'Cantarranas' methodology to build resilience and local level capacity for disaster risk reduction, including the mitigation of climate change risks. The women's groups are part of the Community Practitioners' Platforms for Resilience (CPPR) of GROOTS International and the Huairou Commission. The Cantarranas methodology is led by women coaches; in Guatemala and Honduras they have been certified by the National Coordinator for Disaster Reduction (CONRED) and the Permanent Commission for Contingencies (COPECO).

The Cantarranas methodology provides knowledge to local governments and communities about risk reduction concepts. It offers examples of resilience practices and tools that communities can use to map local hazards and vulnerability. This information can be turned into a risk analysis and used to design and carry out actions to achieve the objectives of the Ten Essentials, the cornerstone of the Making Cities Resilient Campaign. At the end of the process, mayors receive a certificate to recognize that the community is now a Campaign partner.

Photo: UNISDR

On Friday, October 4, 2013, the official launch of the Guatemala Resilience Festival took place at the stations of the Executive Secretariat of the National Coordinator for Disaster Risk Reduction (CONRED). The activity was attended by representatives of the 42 stands, these include international organizations, government institutions and national entities that are part of CONRED System; also represented are private companies, the media, the Government Communicators Network, the Interagency Group on communication and Information –GICI, United Nations and members of musical groups that share the advocacy.

Acre, Israel: Engaging Stakeholders during Risk Assessments

The City of Acre/Akko in Israel is a World Heritage site. As part of its risk preparedness strategy, the City of Acre has prepared an earthquake and tsunami plan, as well as a risk assessment for flooding due to extreme climatic conditions. The Local Authority of Acre together with national institutions has established teams to provide for socio-economic resilience reaching all sectors of this multi-cultural City. This has included better understanding of the structural engineering of the historic buildings so that the local community can improve building maintenance. One of the components of this workshop was the preparation of a population needs assessment data base, identifying a hierarchy of support circles that can act and intervene, depending on the severity of a hazard event. These groups include local representatives, professionals such as social workers, psychologists, counselors, educational personnel and volunteers.

Photo: Michael Turner (Bezalel Academy of Arts and Design)

Engaging the community at the workshop in the City of Acre, Israel

Essential 7: Understand and Strengthen Societal Capacity for Resilience

"Identify and strengthen the social connectedness and culture of mutual help through community and government initiatives and multimedia channels of communication."

Focus on engaging citizens in disaster risk reduction; addressing local vulnerabilities and capacities; promoting social inclusion and gender equality; involving children and the youth; awareness raising through information, education and training; learning from past experiences and best practices from other cities in the world.

Photo: Ebru Gencer (CUDRR+R and UPAG)

The UNESCO World Historic City of Dubrovnik, Croatia is prone to earthquakes and wildfires.

Why?

Social connectedness and a culture of mutual help have a major outcome on the impact of disasters of any given magnitude. Understanding patterns of social vulnerability, developing a culture of risk reduction and adequately addressing the needs of the most vulnerable significantly contribute to increasing the city's coping capacity in the face of natural hazards. Social cohesion and community participation have been recognized as key factors for successful disaster risk management, and awareness- raising educational programs and trainings for the population have proven to help significantly in increasing preparedness.

Unanimously recognized as a key factor for successful disaster risk management, and awareness-raising educational programs and trainings for the population have proven to significantly help in increasing preparedness. Access

How?

Provide social support to the most vulnerable.

- Ensure that healthcare and social assistance programs are available, accessible, adequate and sufficient to meet the population's needs.
- Deliver free and accessible quality education for all.
- Identify most vulnerable groups with regard to gender, age, ability and cultural identity, and adequately address their needs.
- Link disaster risk reduction strategies with poverty reduction efforts.

Understand and strengthen social cohesion in the city.

- Understand the drivers, patterns and dynamics of social cohesion in the city and enhance social connectedness.
- Promote social inclusion, gender equality and community participation

Understand and strengthen social capacity in the city.

- Identify and support grass-roots organizations, particularly those working on building resilience.
- Raise awareness on disaster risk reduction through information and communication.
- Include disaster risk reduction in school curricula and other educational programs, and provide training.
- Establish, train and maintain neighborhood disaster management committees.
- Support a culture of disaster risk reduction in the private sector and ensure business continuity.
- Protect cultural and natural heritage.

Examples

Sao Paulo, Brazil: Civil Defense Helps Citizens Know Their Risk

In Brazil, an innovative educational approach teaches students to reduce risks caused by rain events. The goal is to train 30,000 students in public schools throughout the State of Sao Paulo. A virtual game called “The Adventure” teaches students what they can do to prevent floods and other hazardous conditions brought about by rain, landslides and thunderstorms. The course is free and uses an interactive platform that can be accessed from any computer. The virtual environments replicate real situations, and working with an avatar (a figure that represents the user in computer-based games), the young participants’ mission is to make these environments safe and secure. Each of the nine game modules depicts a different scenario, such as open areas on rainy days, buildings near the slopes or water tanks and garbage dumped in inappropriate open spaces. To complete each level, students must perform all tasks and advise on how to avoid problems. Students who have successfully completed all levels receive a certificate.
Geraldo Alckmin, Governor of the State of Sao Paulo says: “Sao Paulo is the only state in Brazil that has specific

resources for the Civil Defense to sign agreements with its cities for preventive and recovery actions," thereby enabling the cities to carry out structural works that minimize the damage caused by natural disasters.

See more at: http://www.unisdr.org/archive/40966

South America: Enhancing resilience to natural hazards

Regional cooperation can significantly contribute to fostering local capacities through knowledge exchange, network building and sharing of best practices. ''Enhancing Natural HAzard resilience iN South America" (ENHANS) is a UNESCO international project that seeks to train a critical mass of experts, including stakeholders from national and local authorities in Chile, Ecuador, Peru and Uruguay to implement methods and tools tackling rapidly changing vulnerability, to raise awareness among communities and to reduce disaster risk caused by natural hazards, while promoting regional cooperation. The project is aimed at understanding and measuring resilience to natural hazards in selected communities, with a particular focus on training and capacity building to empower local stakeholders. The project is coordinated by UNESCO's Section on Earth Sciences and Geo-Hazards Risk Reduction in Paris. Project partners include the Global Earthquake Model (GEM), the Institute for Advanced Studies of the University of Pavia (Italy), the German Research Centre for Geosciences (GFZ), the International Centre for Water Hazard and Risk Management (ICHARM), the Asian Institute of Spatial Information (AISI) and Cornell University (USA). The project is financed by the Government of Flanders, Kingdom of Belgium.

Read more at: www.unesco.org/new/en/natural-sciences/special-themes/disaster-risk-reduction/ and http://meetingorganizer.copernicus.org/EGU2016/EGU2016-15750.pdf

Photo: Luis Romero (UNESCO)

Implementation of the ENHANS project in South America

Odisha, India: Building coastal community resilience to tropical cyclones

The coastal State of Odisha, India, has experienced a long record of tropical cyclones, the most destructive being the super cyclone of 1999 which caused 9,843 fatalities and massive destruction. After this catastrophic event, the State Government made significant efforts toward improving its disaster risk management structure. This included the establishment of a State Disaster Management Authority under the provisions of the 2005 National Disaster Management Act, the construction of protective infrastructure, as well as conduct of training and awareness programs.

This significant commitment to disaster risk reduction led to a dramatic decrease in disaster mortality, with cyclones Phailin in 2013 and Hudhud in 2014 resulting in 42 and 22 fatalities, respectively. The case of Odisha was featured as a success story in 'Global Assessment Report on Disaster Risk Reduction 2015' for this achievement. However, natural hazards continue to have a great impact on the livelihoods of local communities that are reliant on agriculture. The Leverhulme Trust funded 'Pathways of REsilience to FUture Storms' (PREFUS) project at the University of Southampton(UK) aimed to understand the resilience of rice-dependent communities in Odisha by using remote sensing and socio-economic data, to predict the impact of tropical storms on communities and aid decision making for planning. The project aimed to identify where and how rice croplands withstand or recover rapidly from tropical cyclone impacts so that there is little or no harm to livelihoods, food security and economic development in the region. Similarly, a research study was conducted by an international consortium led by the University of Southampton as part of the 'DEltas, Vulnerability & Climate Change: Migration & Adaptation' (DECCMA) project. In collaboration with UNESCO, the study looked at evaluating community resilience to tropical cyclones in the Mahanadi delta, Odisha to search for empirical evidence of societal resilience and contribute to its assessment and operationalization.

Photo: Margherita Fanchiotti (UNESCO)

Residents of Odisha, India participating in risk awareness projects.

Essential 8: Increase Infrastructure Resilience

"Assess the capacity and adequacy of critical infrastructure and develop a plan or strategy for its protection, update and maintenance. Where needed ensure to develop protective, risk mitigating infrastructure."

Why?

Adequate and well-maintained infrastructure is critical to providing essential services, responding to disasters, and reducing the creation of risks from hazards and the impacts of climate change.

How?

Prepare and implement a critical infrastructure plan or strategy to protect critical infrastructure, utilities and services.

- Promote a shared understanding of the risks between city and various utility providers of the points of stress on infrastructure systems and risks at the city scale.
- Maintain appropriate building codes, regulations and continuity arrangements that aid the construction of critical infrastructure in low risk areas.
- Manage continuity plans for the provision of critical services.
- Sufficiently invest in the maintenance and upgrade of critical infrastructure.

Ensure that protective/risk mitigating infrastructure (e.g. flood defenses, seismic designs) is in place where needed and are properly maintained.

- Supervise to ensure that existing, protective infrastructure is well-designed and well-built, based on risk information.
- Administer processes that maintain protective infrastructure and ensure the integrity and operability of critical assets.
- Create a comprehensive inventory or map of all critical infrastructure located within city limits.
- Have policies in place to enable the monitoring, maintenance and upgrade of drainage infrastructure (taking into account climate change).

▶ Ensure that there are continuity plans for the provision of services and that the critical facilities (such as hospitals, schools, government buildings, electrical substations and others) are located at low-risk areas and built according to relevant building codes.

Photo: Margarita Villalobos (UNISDR)

Guatemala, scrap tires were used to reinforce erosion-prone roads and embankments. This low-cost risk reduction measure not only protects local infrastructure investments from erosion, but also contributes to solid waste management through reuse and recycling.

Examples

Sendai, Japan: Safe Schools, Model Schools

Even prior to the 2011 Great East Japan Earthquake and Tsunami, Sendai had taken important steps to earthquake-proof its schools by installing solar power generators and storage batteries to secure electric power, creating disaster response manuals, and holding evacuation drills twice a year. A few schools were designated as 'disaster prevention model schools,' that implemented the most advanced research and practices. To ensure the safety of children and secure the schools' ability to serve as evacuation centers, all schools were retrofitted according to seismic assessments. However, the impact of the 2011 earthquake and tsunami was much larger than anticipated. Despite this, the city was able to minimize the damage, due to the measures put in place in safeguarding infrastructure and systems. As such, the disaster renewed the city's commitment to step up efforts to build safe schools and improve disaster prevention education based on this experience.

After the earthquake, a junior high school in each ward and multiple elementary schools in the same district were designated as model schools. Each school has a disaster prevention officer. Research is underway on how to improve collaborative practices with the families of schoolchildren and the community. The results will be used to improve citywide disaster prevention education.

The fruit of previous disaster prevention efforts was clear during the 2011 disaster. Despite the damage from a tsunami of a scale beyond all expectations, the lives of all children inside school buildings, including those of the children at the three coastal schools were saved. This even propelled Sendai to continue to plan for safer school infrastructure and to enrich disaster prevention education for the generations to come.

More information on Sendai's activities here: http://www.unisdr.org/archive/40266

Photo: UNISDR

Safe Schools in Japan.

Karlstad, Sweden: Flood Risk Prompts Protection Measures in Critical Facilities

The City of Karlstad, Sweden, is located on the largest delta in northern Europe, where the river Klarälven flows into Lake Vänern. Its location contributes to a significant risk of high water levels in both the river and the lake. The Swedish Government has identified Karlstad as the city with the largest urban population likely to be affected by a 100-year flood. However, flooding is not the only risk the city faces. It also must meet the challenges of adapting to a changing climate.

Karlstad is working in a number of ways to secure its critical infrastructure. The sewage system has been improved with check valves and open storm water systems. GIS mapping illustrates alternative routes for the most important roads during flooding and emergencies; and sites where elevated bridges, culverts and embankments need to be constructed.

As the General Hospital in Karlstad serves six (6) municipalities and is at high risk from flooding, the City of Karlstad and the Värmland County Council are planning to construct a levee to protect the hospital and the surrounding area, including main roads that lead to the hospital to ensure that it can remain operational during emergencies. The levee will serve a dual purpose: in addition to helping to manage flood risk, it is also designed to serve as an elevated pedestrian and bicycle path. The levee will incorporate a green storm water management system with infiltration dams and four (4) pumping stations with check valves. As an extra security measure, seven (7) surface shutters will allow extreme rainfall to pass through the levee.

The construction of the levee will provide better control of storm water and improve traffic safety due to the additional pedestrian crossings and better lighting. The result will contribute to the natural beauty of the waterfront. The added benefit of using the levee as a pedestrian and bicycle path will allow the municipality to comply with its climate and environmental strategy, which aims to encourage travel by bicycle and maintain a safe and attractive environment, thereby turning flood protection measures into a positive experience.

The city's contingency plan for flooding, developed in coordination with stakeholders from the municipality and civil society, prioritizes critical infrastructure. The City places great emphasis on disaster risk reduction and public employees take courses on climate change adaptation measures and environmental management, as Karlstad seeks to preserve its current geography and development.

To know more on what Swedish cities are doing to improve DRR please see:
https://www.msb.se/RibData/Filer/pdf/27543.pdf

Hoboken, New Jersey, USA: Lessons from Superstorm Sandy Improve Urban Flood Management

In the wake of Superstorm Sandy, the city of Hoboken, New Jersey (USA) recognized the need to develop a comprehensive Resilience Building Strategy to recover from and prepare for the impact of future hurricanes and floods. The storm severely damaged important and critical infrastructure. The city's sewage system overflowed as high tide levels rose above the system's components. Damage to the sewage system from salt water coastal flooding was more destructive than more common flooding due to intense rainfall. Superstorm Sandy also flooded the city's power stations. The flood pump, designed to pump 50 million gallons of water a day, was severely overloaded to handle the estimated 500 million

gallons of water produced by the storm. Although the pump worked immediately after the storm surge, it ceased to function once the city lost power.

To protect critical public facilities from damage during disasters, Hoboken's comprehensive flood mitigation plan includes flood pumps, green infrastructure, and coastline protection from rising seas and storm surges. This urban water strategy centers around four approaches to flood management: Resist—hard infrastructure and soft landscape for coastal defense; Delay—policy recommendations, guidelines, and urban infrastructure to slow rainwater runoff; Store—a circuit of interconnected green infrastructure to store and direct excess rainwater; Discharge—water pumps and alternative routes to support drainage.

"I have been advocating for a comprehensive solution to Hoboken's flooding problems since I first ran for City Council in 2007," said Hoboken Mayor, Dawn Zimmer. "This project will implement a water management strategy that will comprehensively protect all of our residents, businesses, and the critical assets we share like the PATH [the rapid transit railroad that connects New Jersey with Manhattan], transit stations, and the hospital. One of the elements of the plan will use parks as flood protection, creating more open space for residents to enjoy." The city is studying the purchase of three tracts of land in the flood hazard area to be used as parks. Storm water retention facilities will be incorporated into the design to reduce runoff. The design will also include resilient 'green infrastructure' for floodplain management to reduce the effects of extreme storm events.

Photo: Ebru Gencer (CUDRR+R and UPAG)

Hoboken, New Jersey experienced significant flooding from Hurricane Sandy

Essential 9: Ensure Effective Preparedness and Disaster Response

"Ensure effective disaster response by creating and regularly updating contingency and preparedness plans, installing or linking with early warning systems and increasing emergency and management capacities."

▶ Ensure that contingency plans include law and order, and provide vulnerable populations with food, water, medical supplies, shelter and staple goods

Photo: Navneet Yadav /UNISDR

The Himachal Pradesh State Disaster Management Authority (HPSDMA) organized a series of events starting from October 8, 2013 (8th anniversary of the Kashmir Earthquake) to 13th of October 2013 (IDDR 2013) as a part of 'SAMARTH-2013'- the annual mass awareness and capacity building campaign of the HPSDMA.

Why?

Emergency preparedness and response plans save lives and property, and often contribute to resilience and post-disaster recovery by lessening the impact of a disaster. Preparedness efforts and early warning systems help ensure that cities, communities and individuals can act in sufficient time and reduce personal injury, loss of life and damage to property.

How?

Maintain a disaster management plan that outlines city mitigation, preparedness and response to local emergencies.

- Establish that the plan provides the urban strategy, organization and structure for disaster preparedness and response, including details for the roles, responsibilities, resources, cooperation and coordination modalities among stakeholders.

Make arrangements to continue critical functions in emergency situations.

- Maintain comprehensive and updated city level plans that outline how government and other key services are to remain in operation in the event of an emergency.
- Support the plan with adequate capacity and the resources it needs for the purpose of emergency response (e.g. volunteers and rescue equipment).

Connect the city to relevant Early Warning Systems (EWS).

- Ensure that EWS has access to information for all relevant hazard events.
- Establish that EW broadcasts have sufficient citywide coverage to alert the population.
- Prepare and maintain adequate resources and tools used for the dissemination of warnings through various means (social media, radio, SMS, sirens, etc.).

Examples

Manchester, UK: Working Together to Mitigate and Respond to Fires

In August 2013, a fire began at a waste transfer site used to store thousands of tons of flammable waste. Greater Manchester's emergency services worked tirelessly for 21 days to extinguish the fire and protect local communities. As agreed previously by the Greater Manchester Resilience Forum—the conurbation-wide partnership that co-ordinates activities related to civil contingencies—the organizations which were involved in tackling the fire came together in the aftermath to conduct a post-event review, identify lessons learned and recommend future actions.

As a result, new and collective ways of working were established to mitigate the risk of fire and to respond if fires do occur. The first involved processes for identifying suitable land for new sites. Consultants would assist in developing the conditions that must be met for planning permission to be granted, thereby promoting safe operation of the site. The second involved joint enforcement. Although public agencies would initially work with site owners to promote safe working practices, partners established how enforcement actions might, if necessary, be coordinated to reduce on-site risk. Finally, taking the lessons learned from several fires at waste transfer sites in Greater Manchester, a joint plan captured successful response strategies for minimizing the health, environmental and economic impacts of such fires.

Photo: Ebru Gencer (CUDRR+R and UPAG)

Media City in Manchester.

Cebu Province, Philippines: Evacuation Saves Entire Island from Typhoon Haiyan

The prompt evacuation of most of the 1,000 people from a tiny island saved many lives when many houses were damaged or destroyed by Typhoon Haiyan in late 2013. The former Mayor of San Francisco, Cebu Province (Philippines), Alfredo Arquillano, said years of work to strengthen community preparedness and reduce disaster risk prevented a catastrophe for the residents of Tulang Diyot. "The day before, when it was clear how bad the typhoon would be, we decided to evacuate all 1,000 people. Because we've done so much work on disaster risk, everyone fully understood the need to move to safety," Mr. Arquillano said. Before the storm arrived, all residents had been relocated to designated evacuation centers both on and off the island. As a result of local government preparedness drills, it was not difficult to convince people to move to a safe location. "It just shows that preparedness pays. We have been working for years on early warning and evacuation procedures. The awareness level of the community was so high that it went well," says Mr. Arquillano. Therefore, Tulang Diyot achieved a remarkable feat: zero casualties.

Mr. Arquillano is a Champion of the Making Cities Resilient Campaign, and San Francisco won the 2011 UN Sasakawa Award for Disaster Risk Reduction for its community work, based on the 'Purok system,' an indigenous method of self-organization. Watch a video on the evacuation of Tulang Diyot: http://bit.ly/1y9AwAy

Photo: UNISDR

The tiny island of Tulang Diyot in Cebu, Philippines.

Galle, Sri Lanka: Village-Level Disaster Committees for Tsunami Early Warning and Response

Galle was one of the most severely affected districts in Sri Lanka following the Indian Ocean tsunami of December 2004, which killed 4,330 people and displaced 26,278 families. In order to better prepare communities for impending coastal hazards, the Galle District Disaster Management Coordinating Unit (DDMCU), under the guidance of the Disaster Management Centre and the Galle District Secretary, formed village disaster management committees in 146 coastal villages lying along Galle's 72-km coastline.

The purpose of creating the village level committees was to disseminate early warnings, take emergency response actions, distribute disaster relief supplies, and protect the human rights of disaster victims. As part of this exercise, five subcommittees were formed and trained for early warning, search and rescue, first aid, camp management and security, demonstrating solid community participation in the process. Committee members included village leaders, religious leaders and community members. Each village with the support of the Divisional Secretary, Grama Niladarie (public officials), and the disaster management committees were responsible for taking immediate action.

The Disaster Management Centre operates seven early warning towers in the Galle district and the DDMCU is managing a 24/7 emergency operation center. When a warning message is received, the DDMCU distributes the message to the community. Police stations and army camps in the district are also connected to the systems to support the dissemination of tsunami warnings.

Photo:Dilanthi Amaratunga (University of Huddersfield).

Pottuvil, in Eastern Province, Sri Lanka

Mashhad, Iran: Preparing for Earthquakes

City of Mashhad joined the Campaign in 2010 as the first Iranian city which administrates integrated and recurrent diverse campaigns for making cities resilient. During 2015 -2016, Mashhad City adopted the Sendai Framework. In the past there have been a number of disaster risk reduction activities. Among them are:

1. Holding disaster preparedness exercises with participation of groups like urban managers, experts, citizens and students;
2. Holding various training courses for managers and disaster management experts, citizens and students;
3. Grassroots activities organized by volunteer groups for disaster management in all 12 districts of Mashhad Municipality and maintaining continuous relationships among them.
4. Holding the fourth Iranian National Award for Disaster Management with the goal of identifying and implementing creative initiatives for reducting the effects of natural disasters along with showing support for inventors and innovators;
5. Active involvement in the field of urban safety based on safe community model and concept.
6. Designation of the director of Mashhad municipality disaster management department as the chairman of the Asian Network of Safe Communities until 2020;
7. Supporting the design and implementation a system of earthquake damage estimation by Iranian professors and experts;
8. Design and implementation of integrated disaster management system based on the four stages of disaster management cycle by Iranian experts;
9. Rebuild and retrofitting of the old urban fabric in Mashhad with small investments in cooperation of citizens; and ,
10. Training 2,000 Mashhad citizens familiarizing them with earthquake phenomena by making use of an earthquake simulator.

Photo: Mashhad Municipality

Earthquake simulator used to educate Mashhad citizens

Chile, Colombia, Ecuador and Peru: Coastal Communities preparing for Tsunamis

"The southeast Pacific region, which includes the coasts of Chile, Colombia, Ecuador, and Peru, are particularly susceptible to tsunamis as they are located in an active quake zone with a high risk of earthquakes occurring in the sea, which are precisely those that generate tsunamis," says Hector Soldi, Secretary-General of the Permanent Commission for the South Pacific, part of the UNESCO's Intergovernmental Oceanographic Commission (IOC). National Commissions on early warning in these four countries, are collaborating on standardized operating procedures for early tsunami warning communications, an excellent example of dealing with trans-boundary risks, through regional cooperation on risk reduction.

This initiative aims to create a regional system with shared strategies and standardized procedures that apply to the national as well as local level. The goal is to raise the level of awareness and the resilience of vulnerable communities that may be impacted by tsunamis. At the same time, it seeks ways to promote community participation in the design and implementation of prevention, preparedness, early warning and disaster response. To date, the main results of the project have been: a) strengthened knowledge and capacities in the school community (students, teachers, administrators, parents) regarding preparedness and risk reduction for tsunamis; b) development and implementation of local disaster risk reduction plans, in cooperation with communities; and c) improved mechanisms—between early warning centers and national emergency and education authorities—for regional interagency coordination on early warning for tsunamis.

For more information: http://ioc-unesco.org/

Photo: UNISDR

Indian Ocean Tsunami Warning and Mitigation Workshop

Essential 10: Expedite Recovery and Build Back Better

"Establish strategies for post-disaster recovery, rehabilitation, and reconstruction ensuring that they are aligned with long-term planning and provide an improved city environment and increased resilience for the affected community." ."

Recovery, rehabilitation, and reconstruction can, to a considerable degree, be planned ahead of the disaster. This is critical to building back better and making nations, cities, and communities more resilient before a disaster happens.

Photo: Dovendra BC/ UNISDR

People become more vulnerable after a disaster. Combining livelihood activities that reduce communities' risk, such as building back a more resilient road which takes account of the local risk profile, provides multiple economic and social benefits.

Why?

Ensuring that recovery, rehabilitation, and reconstruction are collectively aligned with long term planning goals will result in an improved city environment and increased resilience for the affected community. A well- planned and participatory recovery and reconstruction process helps the city reactivate itself, restore and rebuild its damaged infrastructure and recover its economy, empowering citizens to rebuild their lives, housing and livelihoods. This will also be a period to learn from past mistakes to develop sound rebuilding and development strategies.

How?

Establish strategies for post-disaster recovery and reconstruction, including economics and societal aspects necessary for restoration.

- Maintain a financing mechanism that enables the access to and the distribution of funds for recovery.
- Coordinate designated agencies, sectors, and committees for recovery as part of a wider multi-stakeholder process.

Implement the concept of "Build Back Better."

- Complete post-event assessment to analyze failures and abilities, and document the lessons learned to be integrated into recovery and reconstruction processes.
- As part of the recovery process, consider new risks and other key information through reviews and updating of urban development plans and processes.

Examples

Tameside, UK: A Focus on Business Recovery

In February 2014, Greater Manchester received a national severe weather warning of winds up to 80 mph. The wind strengths caused widespread structural damage, bringing down trees and leading to a loss of power in many areas. One of the buildings damaged during the high winds was a 100-year-old mill in Dukinfield, Tameside, that housed many business units. With the building's structural integrity compromised, together with the evacuation of adjacent residential properties, an evacuation of the many small businesses from the premises began until the mill could be made safe.

The Council put a range of measures in place to help business owners maintain their livelihoods and keep their small businesses within the community in the post-recovery period. Business recovery was supported as the Council, the Health and Safety Executive and the mill owner worked with businesses to safely salvage valuable goods and assets. Business space within the community was also made available and made rent-free for the first six months, to help sustain operations. This continued for more than 90 days and in the end the mill had to be demolished. The Council is now working with the landowner to plan how best to redevelop the land while maintaining its small business focus.

For more information on what Greater Manchester is doing about resilience please see:
http://www.unisdr.org/campaign/resilientcities/cities/view/3899

Photo: UNISDR

Former UNISDR chief Margareta Wahlstrom (centre) with representatives from the ten boroughs of Greater Manchester shortly after joining the Making Cities Resilient Campaign in 2014: Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford and Wigan.

Construction of In-Situ Temporary Shelter in Nicaragua and Honduras

Following Hurricane Mitch, the IFRC and USAID constructed traditional in-situ temporary shelters called 'champas' on victims' properties in Nicaragua. Those who were provided with these structures were able to remain in the vicinity of the reconstruction effort and therefore tended to stay more actively involved throughout the entire rebuilding process. The provision of construction skills training was coupled with the construction of champas, thereby allowing beneficiaries increased opportunity to rebuild their own permanent houses (and to further improve the interiors once constructed). They were also able to modify the champa so that it served as their new permanent home. In Honduras, many residents actually resided in the structure of their damaged or destroyed home while repair or reconstruction was carried out. In many of these communities, the project resulted in an overall improvement of the standard of living for occupants. For instance, the residents of three settlements in Honduras organized themselves to obtain access to electricity and public transportation. They also set up a self-managed water project.

For more information, please see:
http://www.proventionconsortium.net/themes/default/pdfs/IFRC_Mitch_recovery07.pdf

Sendai, Japan: Gender Considerations for Evacuation Centers

In the aftermath of the Great East Japan Earthquake and Tsunami in March 2011, the needs of women were insufficiently considered in many evacuation centers, which were largely operated by community groups and managed by men. Women must participate in the decision-making process for the operation of evacuation centers as the needs of women and girls differ from those of men.

Prior to a review of the regional disaster plan, the membership of the Sendai City Disaster Prevention Council was changed to include more women. Until that time, there were only two women committee members (of a total of 60). The number of committee members was increased to 70, 11 of whom are now women (15.7%).

Since then, there has been an increased focus on women's perspectives on regional disaster preparedness efforts. In addition, in recognizing the shortage of women with practical knowledge of disaster preparedness, Sendai will include five female leaders from each of the 113 federations of neighborhood associations in the city, totaling about 600 leaders by the end of 2015. So far, 197 citizens have completed the course and the number of female leaders has significantly increased. An increase in the number of women leaders in disaster preparedness and risk reduction will benefit not only the operations of evacuation centers but also provide a valuable resource and expertise to victims of the psycho-social (psychological, emotional) impacts of a disaster.

NOTES

3

CHAPTER 3

Implementing the Ten Essentials: Achieving Resilience

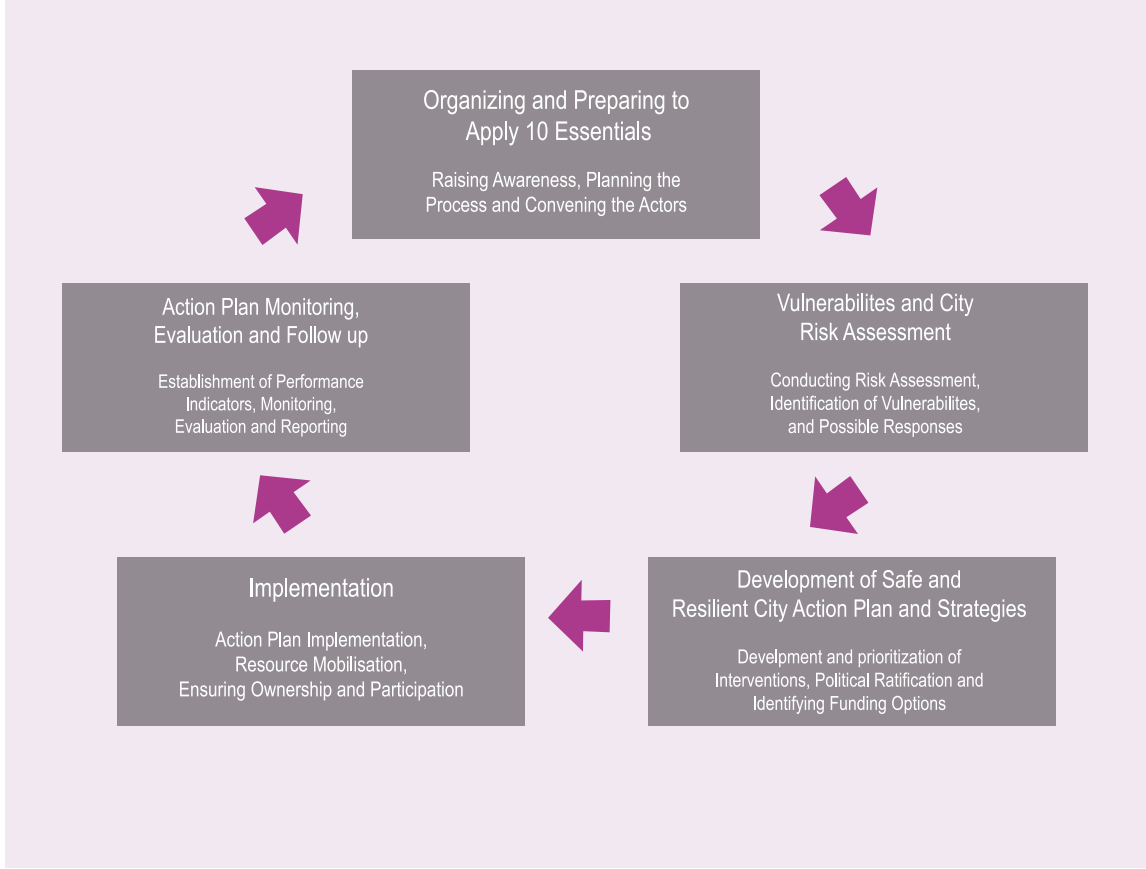
Photo: UNISDR.

Incheon Free Economic Zone Vision Model.

Disaster risk reduction requires a systematic, multi-faceted and proactive approach to identify, assess and develop plans to reduce disaster risk. Local governments need to develop a preparation process towards the five (5) steps that make up the Resilience Building Cycle. These steps are:

1. Engaging in Resilience through Organization and Preparation;
2. Understanding Risk and Assessing Resilience;
3. Establishing a Plan of Action;
4. Financing and Implementing the Plan of Action;
5. Monitoring and Evaluating the Plan of Action for Resilience.

This Chapter discusses in detail these five (5) steps and provides examples of what local governments have done towards becoming resilient.



The Cycle of Resilience Building using 10 Essentials.

Engaging in Resilience: Organizing the City and the Stakeholders

Local Government Leaders must commit themselves to engaging in resilience building. Through understanding the significance of investing in disaster risk reduction, they ought to see resilience building as part of their City Sustainable Development Strategy and Vision. This awareness will set the stage for the preparation of institutional target setting.
However, disaster risk management is a complex task that requires collective effort from all the different stakeholders. Local governments cannot address all matters alone and require assistance in terms of funding, human resources, knowledge, data and information, professional services and other resources from the various stakeholders. The private sector, academic organizations, civil society and other stakeholders can contribute significantly to disaster risk reduction; partnerships are essential to build resilience.

It is important to facilitate the engagement of local government decision makers, academia, private sector and the community within the local government. City leaders are expected to develop enabling environments to facilitate effective partnerships so that all can positively contribute towards risk reduction. Once all actors are convened, the participatory process is formalized and the City will be ready to plan and execute the Resilience Building process.

Prepare Institutional Setting and Raise Awareness

- The Local Government Leader is informed about the importance of engaging in resilience building. The leader makes a choice to invest in disaster risk reduction as an integral part of the City's Sustainable Development Strategy and Vision. It is a commitment shown through: (1) forming a team, (2) allocating a dedicated budget. (3) joining the Making Cities Resilient Campaign to seal commitment to implement the Ten Essentials.
- Establish the legal framework and the Resilience Building agenda to undertake DRR; a legal policy framework is developed to adopt a policy on resilience, if necessary.
- Designate persons to form a technical entity or team in the municipality/city designated to lead the Resilience Building Agenda and thereafter, implement actions.
- Promote public awareness of issues among stakeholders.

Convene Actors, Define Roles and Responsibilities, and Formalize Participatory Process

- Identify and convene key stakeholders to be engaged in the resilience building process. Define responsibilities concerning various aspects of disaster resilience, assigning them with clear roles.
- Build up a multi-stakeholder task force to implement the process.
- Establish sector or thematic working groups.
- Establish the baseline for the work ahead. Identify needs, priorities and city resources accordingly.
- Establish mechanisms to broaden participation, oversight and information dissemination.

Photo: University of Huddersfield.

The Municipality of Batticaloa hosted a capacity building event for local stakeholders, addressing the Ten Essentials of the Making Cities Resilient Campaign

Plan and Execute the Process

- Define the methodology to be used by the multi-stakeholder task force.
- Determine acceptable level of risks from among the stakeholders as risk concerns are laid out for decision making related to urban city investments.
- Create and publish a work plan.
- Build technical capacities and mobilize resources to implement the work plan.

Examples

Batticaloa, Sri Lanka: Engagement of the necessary organizations to coordinate disaster management activities at local level

Following the 2004 tsunami, the government of Sri Lanka took various steps towards creating institutional arrangements for disaster management within the country including the approval and implementation of the Disaster Management Act in May 2005. In the same year, the National Council for Disaster Management (NCDM) established the Disaster Management Centre (DMC) with a mission to create a culture of safety among communities and the nation at large through systematic management of natural, technological and man-made disaster risks. All disaster management activities are coordinated by the DMC while district level coordinators facilitate disaster management activities in each district with the support of relevant government and non-government agencies.

The District Disaster Management Coordinating Unit (DDMCU) of Batticaloa coordinates all disaster management activities through its Divisional Secretariats and Grama Niladarie divisions. Some initiatives include the formation of district, divisional and village level disaster management plans and committees, conducting training and awareness programs for community and school children such as mock drills, identifying safety locations and routes, putting in place an early warning system, conducting search and rescue training, and providing livelihood support. A number of NGOs and INGOs are working closely with the DDMCU providing support in terms of finance, training, livelihood development, water and sanitation. Universities and research organizations also contribute by conducting workshops and training events for local officials and communities and providing research support. In addition, DDMCU collaborates with the local governments and other government agencies operating at the district level such as the three levels of local governments (municipal, urban and Pradeshiya Sabhas), National Building Research Organization (NBRO), Meteorological Department, Irrigation Department, Gemmological & Mines Bureau (GMSB), Urban Development Authority (UDA), Coast Conservation Department (CCD), Land Reclamation & Development Corporation, Agrarian Services and Central Environmental Authority. Many of these organizations have district level offices in Batticaloa that work closely with the DDMCU in the city's resilience-building activities. It is evident through this example that the necessary institutional arrangements have been in place at local level to manage disaster related activities of the city.

The Makati City Participation Strategy: The Makati Mobile Knowledge Resource Center (MKRC)

Since 2010, the City of Makati has been actively engaged in the Making Cities Resilient (MCR) Campaign. As a pilot city, Makati City has been involved in the promotion and accomplishment of the original Ten Essentials. Because of its efforts, the City was recognized as a Campaign Champion in 2011.

The City Government of Makati recognizes the importance of building alliances with all relevant stakeholder groups including, among others, the different City Government offices (internal stakeholders), national/regional government agencies, academe, public utilities, technical experts, civil society organizations, and community organizations.

Recognizing that building alliances with all relevant stakeholder groups is critical to the process, the City of Makati partnered with SEEDS Asia to develop the Makati Mobile Knowledge Resource Center (MKRC) Project to enhance DRR knowledge and capacities of the citizens and barangay officials.

The First Phase, which has been concluded, involves the training of trainers in all 33 barangays of Makati through practical workshops and community risks assessment (using town watching for disaster education as methodology). The Second Phase entails the roll-out of activities in communities. The end goal is to establish a mobile resource center readily accessible to the community. MKRC is envisioned to be a platform for capacitating community members in terms of knowledge and ability to respond to different hazards.

Photo: Violeta Seva (Makati City and UPAG)

Makati mobile Knowledge resource center

(Top Left Picture): A group representative reported their positive and negative observations and provide their recommendations for their way forward.

(Top Right Picture): The barangay officials plotted the positive and negative obsevations in their barangays on a base map for easier identification on where it was located.

(Bottom Left Picture): The barangay officials from Barangay Urdaneta conducted their town watching activity together with the city government officials. They're taking pictures of the positive and negative observations in their barangay.

(Bottom Right Picture): Mr Ryan Tagle, Research Section Head of Makati DRRM Office, explained how an earthquake-induced landslide happens by using the hazard simulation model.

Understanding Risk: Undertaking Risk Assessments

The Sendai Framework stresses that policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. An effective risk assessment is undertaken to inform proposed strategies to reduce disaster risk by focusing attention and resources on the communities and properties exposed to highest risk. Risk assessment provides a basis for the development of disaster risk reduction action plans and resource allocation. Stakeholders are then acquainted with the city's risk.

Learn about the city's risks and conduct necessary risk assessments

1. Collect and systematize information on city's existing risks, including the analysis of historical disaster data on potential hazards and previous studies/assessments to identify gaps that need to be filled.
2. Carry out a general study or diagnosis of the city that will serve as a baseline of knowledge upon which a risk analysis can be conducted.
3. Involving different stakeholders, undertake an analysis of current and future threats and hazards to identify city-wide exposure and vulnerability that need to be taken into account in the city's long-term plans and programs.
4. Develop risk assessments based on all identified hazards and cascading effects, taking into consideration trans-boundary risks and the impacts of climate change for future risk levels and urban dynamics. Enable local communities to undertake risk assessments.
5. Regularly update risk assessments through multi-stakeholder engagement.

Assessing the State of Resilience

Once risk is assessed, local governments can identify their gaps and strengths through an analysis of the local environment and actors, and prepare an assessment report. UNISDR and its partners have developed a number of assessment tools (LG-SAT, Resilience Scorecard, Local/Urban Indicators, among others – some of which are explained below in detail) for local governments to set baselines for risk reduction and resilience building activities. Local governments may use these tools to review their risk reduction and resilience building progress using the following strategy:

Analyze gaps and strengths and prepare a resilience assessment report

1. Conduct an internal and external analysis of the situation city-wide, identifying strengths, weaknesses, opportunities and threats.
2. Analyze the key actors and stakeholders, resources, and capacities for DRR and resilience building.
3. Prepare a draft assessment report based on risk assessments and communicate the outcomes with all relevant stakeholders.

4 Develop clear mechanisms to integrate risks and their impacts as a decision-making tool across all city departments for their planning and strategies processes, incorporating comments and recommendations from stakeholders.

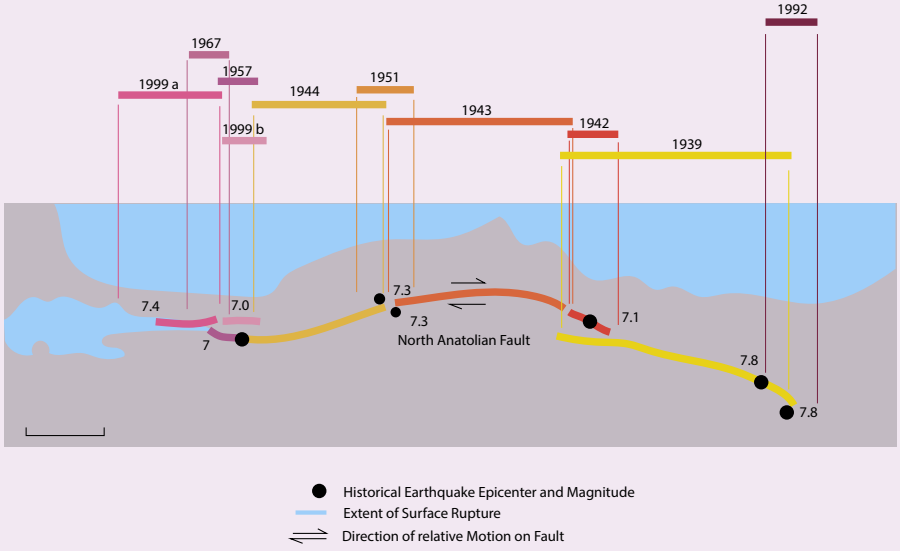
5 Publish and communicate the risk assessment report.

Examples

Istanbul Earthquake Risk Assessment

On August 17, 1999, a 7.4 magnitude earthquake occurred with its epicenter at Gölcük, just south of Izmit, an industrial city east of Istanbul. A few months later, on November 11, 1999, while recovery operations were still under way, a 7.2 magnitude earthquake occurred in the same region with the epicenter near Düzce. Known as the Marmara earthquakes, these two earthquakes caused major damage in and around Istanbul Metropolitan Area and increased the possibility of an earthquake in the Marmara Sea due to the transfer of stress.

Following this heightened risk in the Istanbul region, earthquake probability and risk assessments were done for Marmara Fault and Istanbul. According to the time dependent probability[1] of seismicity and extra tectonic stress loading brought by the 1999 Izmit earthquake, Tom Parsons and colleagues from the United States Geological Survey (USGS) calculated the probability1[1] of an earthquake of M. 7 or greater occurring near Istanbul within the next decade and projected it to be a 32% (+/-12 %), and in the next thirty years 62% (+/-15 %) (Parsons et al. 2000, 1). In 2004, USGS reassessed the hazard with improved Marmara Sea faulting and a new historical earthquake catalog and recalculated that the 30-year probability of an earthquake at Istanbul is 41% (+/-14%) (Parsons 2004).



Historic Progression of Earthquakes on North Anatolian Fault (Courtesy of USGS)

1. In 2004, Tom Parsons (2004) of the USGS reassessed the hazard with improved Marmara Sea faulting and a new historical earthquake catalog and recalculated that the 30-year probability of an earthquake at Istanbul is 41 +/- 14%.

Based on probability calculations, deterministic earthquake hazard assessments were also undertaken in joint studies of the Japan International Cooperation Agency (JICA) and Istanbul Metropolitan Municipality (IMM); and the American Red Cross (ARC) and Boğaziçi University (BU) (JICA-IMM 2002; BU 2002, 75). These studies concluded that the occurrence of a worst-case scenario earthquake with M 7.5 is considered "highly probable" in the next 70 years (IMM 2003, 17). Following this diagnosis, the Istanbul Metropolitan Municipality organized a consortium involving four Turkish universities to prepare vulnerability and risk assessment studies for an Earthquake Master Plan for Istanbul.

Earthquake hazard intensity is based on ground shaking, which depends on the combination of various factors such as the magnitude of the earthquake, the distance from the rupture and the local geological conditions (Smith 2001, 130). Casualties in the earthquakes arise mostly from structural collapses and from secondary hazards such as fires, water inundation caused by tsunamis or dam failures, as well as hazardous material release and explosions. In the Istanbul scenario earthquake calculations, HAZUS99 methodology was used measuring a direct relationship between the structural damage and the number of casualties (IMM 2003, 19). Based on this methodology, casualty levels from a scenario earthquake are projected to be between thirty to forty thousand people based on day and night time population (BU 2002, 243).

The structural damage was computed based on a building inventory that was conducted by the State Institute of Statistics in 2000. According to this inventory and a following building classification study, the majority of building stock (66%%) in Istanbul is one to eight story reinforced concrete frame constructions built after the 1975 seismic codes, and 24% %of buildings are masonry structures (BU 2002, 114-16). However, due to deficiencies in design, concrete quality, and construction practices, the majority of the reinforced concrete building stock in Istanbul is considered to have low levels of earthquake resistant design according to the 1998 European Macro-Seismic Scale (EMS), resulting in the expected structural damages and casualties (ibid. 168).

Consequently, for a scenario based earthquake in Istanbul, intensity based vulnerability calculations for this building inventory estimates 40,268 buildings (about 5.5% of the total building stock) to be damaged beyond repair, a total of 77,000 buildings (10.5%) to be substantially or heavily damaged, and about 200,000 buildings (27%) to be moderately damaged (ibid., 243). In addition to creating the potential for casualties, structural damages will also cause loss of housing stock. Results of the analysis predict a total of 608,000 households to be in need of shelter for a scenario earthquake in Istanbul, without even counting the potential short-term needs of residents in moderately damaged houses such as loss of utilities (ibid., 213, 243).

Source: Adapted from Gencer, E. A. 2008. Natural Disasters, Vulnerability, and Sustainable Development: Examining the Interplay, Global Trends, and Local Practices in Istanbul. VDM Verlag: Saarbrucken.

City Disaster Resilience Scorecard

In most cases, a city's disaster resilience is not entirely within its own control and needs extensive engagement of various stakeholders. This engagement, at times, includes private sector actors, other tiers of government, other urban local bodies in the same area, agencies focused on emergency response, and citizen groups. Involvement of multiple sectors places an extraordinary emphasis on collaboration based on shared information.

To address these complexities and to build consensus, UNISDR with the support of its partners, in this case IBM and AECOM, developed the City Disaster Resilience Scorecard in 2014. Designed to support implementation of the Ten Essentials, the scorecard measures performance level of any city in relation to each Essential. This City Disaster Resilience Scorecard allows a numerical and visual assessment of the status of an area of activity to track progress, to provide a perspective on a city's total disaster resilience posture, while also identifying gaps in plans and provisions.

Fully implemented, the Scorecard supports the local government to establish a baseline for the city of how resilient it is today relative to foreseeable hazards – where it is strongest, and where it is weakest thus requiring time and attention, and potential resources required towards reducing risks. The biggest single contribution that the Scorecard can make is exposing the gaps that may exist but may have been overlooked, the conflicts hidden in assumptions, and plans that could derail a response to a disaster. This is made possible in the context of collaboration and multi-stakeholder dialogue.

Following the adoption of the Sendai Framework for Disaster Risk Reduction and the SDGs, national and local governments called for an updated set of local indicators and its associated tool. With the support of experts, technical organizations, numerous pilots, UNISDR has now developed a 'new-generation' Scorecard that is risk informed and can be curated to characteristics of any city (population size, economic sectors, and hazards).

This second generation Scorecard built on three-tier mechanisms takes into account shocks and stresses that a city may face and supports establishing baselines, identifying availability of processes that help build resilience, and calibrating effectiveness of actions. Implementing this Scorecard will allow any city to develop prioritized actions to improve the situation. Apart from the integration of the numerous existing data sources, and the identification of gaps, cities and investors will gain many benefits from:

1. A systematic assessment of its resilience to the risks it faces, and a basis on which to plan future investments and track progress across all of the many aspects of the required response;
2. Leveraging investments and adopting effective management practices;
3. Supporting up-to-date decision making;
4. Establishing a basis around which to identify and engage the many organizations (state and local governments, utilities, grassroots organizations) on which the resilience of the city depends;
5. Increased economic investment potential, both from reduced exposure or vulnerability and the clear perception that risk is taken seriously;

6 Potential reduction of some of the cost of insurance coverage;

7 Establishment of leadership as a resilient city with the visible evidence of adopting good practice; and,

8 Means to support implementation of the Sendai Framework for Disaster Risk Reduction at local level and to contribute to the implementation of the Sustainable Development Goals as well.

This new generation Scorecard is available at: www.unisdr.org/campaign/resilientcities/home/toolkit

The Makati City Pilot Workshop on the New Ten Essentials

In 2016, the secon generation Disaster Resilience Scorecard based on the Ten Essentials was pilot tested in Makati City, Philippines. The tool grouped into four layers of questions, intending to bring together the local government and its stakeholders to assess the current and future needs and capacities, and to define common goals and strategies.

Initial assessment using the tool revealed that Makati still has weaknesses in certain aspects of DRR. The most notable identified areas for improvement are on risk financing, protection of critical infrastructure, continuity plans, transboundary agreements, and partnership with the private sector. Makati City government has consistently undertaken risk assessment of earthquake and flood hazards, however, there is still a need to conduct risk assessment of other hazards. The information obtained from the use of these tools has been utilized effectively for the organized and structured documentation of Makati's resilience initiatives, essentially assisting the city planners and/or decision makers, who have been enabled to track the city's progress in improving disaster resilience over time and to identify priorities for investment and action. It efficiently served as a guide for the city to seek ways to improve through regular review and evaluation to measure how far the city has gone in terms of its initiatives towards disaster risk reduction and resilience. Consequently, areas needing improvements in Makati's DRRM system are identified and appropriate interventions, revisions, and/or innovations across developmental sectors including, but not limited to institutional, financial, land use, and infrastructure aspects, are programmed.

In a larger scale, Makati's involvement in UNISDR's Making Cities Resilient Campaign made the city an active advocate of disaster resilience.

Photo:Violeta Seva, Makati City.

Makati City Workshop

Bugaba, Panamá: Piloting City Disaster Resilience Scorecard

The Municipality of Bugaba piloted the second generation City Disaster Resilience Scorecard, allowing the city to assess its resilience, based on the Ten Essentials updated according to the Sendai Framework. General data of local governments were collected and a two-day workshop was conducted with relevant actors to validate the assessment of the current situation of the municipality, its preparedness to face risks and to generate an action plan.

In the piloting process, it was vital to get the perspectives of different stakeholders in the territory through their participation in decision making focused on risk management. This strengthened the commitment of citizens and generated a significant multiplier effect among the participating sectors - civil society, the Municipality of Bugaba, municipal representatives, government institutions, academia, research centers and the private sector. The information collected through the planning tool would allow the use of available resources and capacities to develop concrete actions.

Photo: Alberto Pascual.

Bugaba Local/Urban Indicators Workshop.

Establishing a Plan of Action for Resilience

Based on the findings of the risk assessment exercise, local governments can develop a local level action plan that integrates concepts of resilience into plans and programs. The DRR action plan is an essential tool towards supporting a city's resilience and needs to be compatible with the national and local level DRR targets, indicators and development imperatives. The action plan should highlight activities, proposed time scales, responsible agencies/ departments for implementation, operational arrangements, method of financing, expected level of impact, and the proposed activities for monitoring and evaluation. The action plan should also include key performance indicators to measure the success of the proposed risk reduction activities. It is important to engage all stakeholders in the development of the action plan and that their roles and responsibilities are clearly defined.

Define objectives of the action plan and verify political/legal ratification

1. Define vision and objectives of the action plan based on risk assessment.
2. Ensure that the objectives are in line with the City Vision, National DRR strategies/plans as well as internationally agreed frameworks.
3. Set priorities, actions, projects and activities to help meet objectives.
4. Verify whether there is high-level political support and a legal framework to implement and sustain these actions.

Define programs and projects and institutionalize the action plan

1. Develop a DRR action plan, clearly highlighting the time frames, implementation and monitoring mechanisms and financing options.
2. Identify key activities and priorities for the action plan highlighting both short and long term targets in developing resilience of the city.
3. Develop a detailed plan for each of the activity, identifying the expected date of completion, responsible departments/ stakeholders, expected impact, key performance indicators, and the monitoring and evaluation criteria.
4. Incorporate all elements of the action plan into the city's development plan and programs.
5. Outline the roles and responsibilities of stakeholders towards achieving the DRR action plan.
6. Present the DRR action plan to all relevant stakeholders and make them aware about the proposed activities and their roles and responsibilities in achieving the expected outcome.
7. Publish and widely disseminate the action plan to ensure the entire community is aware of its contents.

Examples

Lisbon's Action Plan

The City of Lisbon developed an action plan for resilience similar to the cycle of resilience model as identified by the Making Cities Resilient Campaign. The Lisbon Action Plan of Resilience model is based on a) Developing insights based on stakeholder meetings and consultation; b) Risk Evaluation based on the Disaster Resilience Scorecard; c) Assess impacts of risks; d) Identifying gaps and developing them into main groups of actions that will follow the same approach; e) Developing specific projects based on the main groups of actions that will be conceptualized and organized in time; and f) Monitoring identified projects according to their scope to ensure that improvements are eventually reflected in the scores of the indicators.

Lisbon's Action Plan Process.

As a result of this Resilience Action Plan, the City of Lisbon identified the areas that should be improved, identified promoting actions and aggregated them into projects to be implemented. While the City of Lisbon had many strengths, among which is its SMPC team and implementation capacity (supervisory/management, particularly in relation to advanced technological projects), the lack of financial resources allocated to these initiatives was a main weakness. In addition, the City of Lisbon realized that more involvement of stakeholders in the decisionmaking process is necessary to facilitate resilience building and that a "resilient city depends not only on technology and processes but also in close proximity to its population," where creating awareness is crucial.

Financing and Implementing the Action Plan

Devising an action plan alone is not sufficient to ensure its implementation. Necessary resources including strategic and long-term investments need to be deployed to implement and sustain the resilience measures identified in the action plan. Many local governments can find it extremely hard to contribute effectively towards risk reduction initiatives due to inherent funding constraints. In many cases, cities have to allocate their limited resources to other priorities leaving them with limited financial resources available for disaster risk reduction measures. With this in mind, it is important to identify and develop strategies to finance risk reduction, including exploring innovative financing options. It is key that resilience be embedded into broader development planning to allow for spending from available revenues (see below). It is also necessary to take concrete steps so that implementation is successfully undertaken with broad stakeholder participation and a sense of ownership among all involved.

Establishing a budget and mobilizing resources to implement the DRR action plan

1. Develop an implementation strategy for the plan with short-, medium-, and long-term activities and priorities. Embed these activities into broader development planning and programs so that DRR is built into development budget allocations.
2. Organize the structure, and clearly define responsibilities and roles of all city agencies, actors and the community towards the implementation of the action plan.
3. Assign a capital and an operational budget to implement the action plan based on priorities.
4. Establish the necessary mechanisms and promote the management and mobilization of resources and financing for implementation of the plan's projects.
5. Identify innovative strategies to finance risk reduction, exploring the options to increase private sector investment including public-private partnerships or various financing mechanisms to finance the DRR activities identified in the action plan.

Ensure broad participation and ownership of the action plan

1. Establish and guarantee the validity of formal and informal institutional mechanisms that will bolster actors to take ownership of the plan.
2. Organize awareness programs to promote the benefits of disaster risk reduction, and establish partnerships and alliances at the local, national and international level for the implementation of the plan.
3. Implement activities outlined in the action plan according to the agreed schedule whilst engaging all relevant stakeholders.
4. Organize regular meetings with the relevant stakeholders and communities to make them aware of progress, and to overcome any barriers to successful implementation.
5. Feed information to the national level about the progress towards DRR for national level progress monitoring. National level endorsement of the action plan will facilitate financial and technical support to ensure implementation

Examples

Disaster Risk Management Master Plan of Quezon City, Philippines

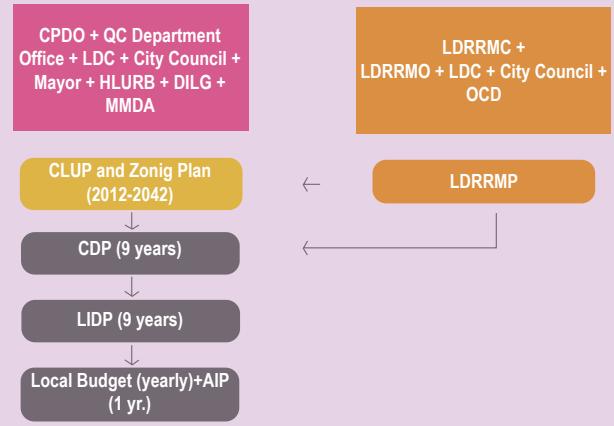
The Disaster Risk Management Master Plan (DRMMP) approach was developed by the Earthquake Megacities Initiative (EMI) to support local-level long-term planning and programming of disaster risk reduction activities. The DRMMP provides opportunities for local governments to systematically and rigorously identify programs, projects, and activities through a master planning process that is an integral part of their planning activities, particularly in relation to land use planning and transportation.

Very similar to the Ten Essentials for Making Cities Cycle, the DRMMP follows a four-step cycle: a) Organization and preparation; b) Diagnosis and Analysis; c) Plan Development; and d) Plan Implementation, Monitoring and Evaluation. The time frame for a DRMMP can span anywhere from 6 to 15 years, depending on the planning cycles of cities.

For the DRMMP to be fully implementable, the legal and administrative processes of a city especially those concerned with approval of mandated plans need to be understood. This requires knowing who approves, when, and through which step in the approval process should the DRMMP be incorporated so that it becomes integrated in the budgeting cycle. This way, budgets for DRRMP priority projects are allocated in the overall budget of the city. The figure below indicates the budget approval process of Quezon City, Philippines, that adopted the DRMMP indicating how the Local Disaster Risk Reduction and Management Plan (LDRRMP) gets integrated in the Annual Investment Plan (AIP).

Acronym

CPDO	City Planning and Development office
LCD	Local Development Council
HLURB	Housing a and Land Use Regulatory Board
DILG	Department of interior and Local Government
MMDA	Motro Manika Development Authority
CLUP	Comprehensive Land Use Plan
CDP	Comprehensive Development Plan
LDIP	Local Development Investment Plan
LDRRMC	Local Disaster Risk Reduction and Management Council
LDRRMO	Local Disaster Risk Reduction and Management Office



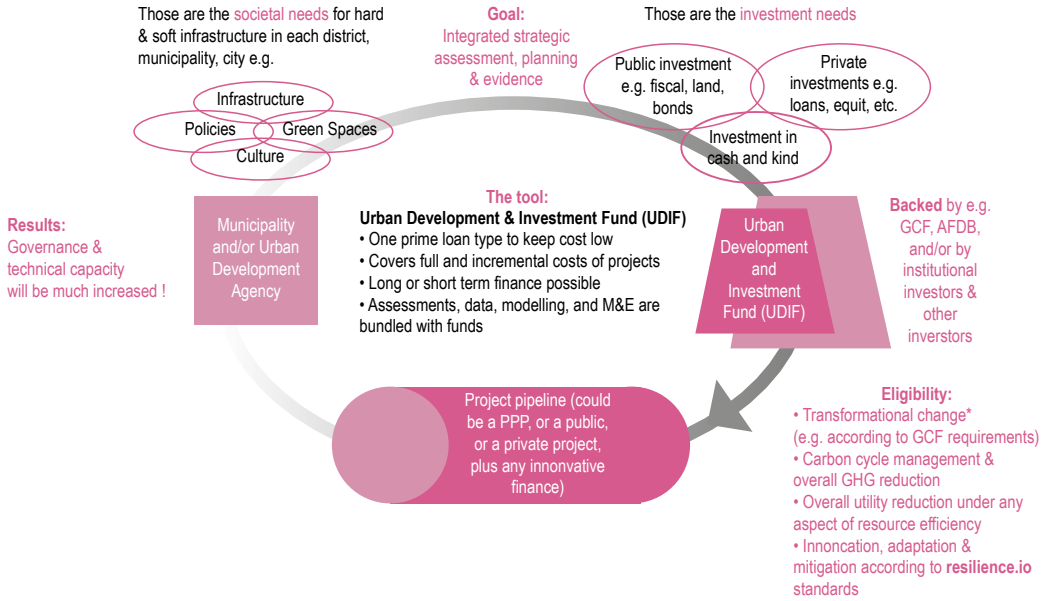
Source: Excerpt from Bendimerad, F.; Zayas, J.; Khazai, B.; and M. K. Borinaga. "Building Disaster Resilience through Disaster Risk Management Master Planning," in Encyclopedia of Earthquake Engineering. Springer-Verlag: Berlin-Heidelberg.

Using T.E.S.T. – The Ecological Sequestration Trust – platform to Calculate Outcomes of an Ongoing WASH (Water, Sanitation, Health) Project in Accra, Ghana and the Toolkit of Urban Development and Investment Fund (UDIF)

By applying the open-source, cloud-based TEST platform (www.resilience.io), it is possible to model a city-region, present city systems (such as Water, Sanitation and Hygiene or WASH) functionality and provide scenarios to support policy inputs from local stakeholders. One such case in Accra, Ghana, demonstrated how the T.ST platform can provide knowledge support for the implementation of macro-planning targets for Greater Accra Metropolitan Area (GAMA) to improve the WASH situation to meet the Sustainable Development Goals (SDGs) as outlined in the Ghana Water Sector Strategic Development Plan (WSSDP).

The aim is to understand what combined projects and changes in infrastructure are required so as to deliver a set of WASH targets. To reach the targets outlined in the WSSDP, country-wide financial needs and mechanisms are outlined, and institutional coordination needs to be strengthened. The TEST platform translates such national targets to identify what efforts will be required in the Ghana city region.

The outcomes are calculated on the basis of a substantial number of input values, which are defined according to scenarios. The identified and needed infrastructure can then be financed through the associated Urban Development and Investment Fund (UDIF) for the city-region.



To learn more about UDIF and the TEST platform, please see www.resilience.io.

Monitoring and Follow-up

The Monitoring and Evaluation (M&E) step is an integral part of the DRR action plan aimed at reducing disaster risk and improving city resilience. Regular monitoring and follow-ups are needed to ensure compliance with the set objectives and targets. These should encompass aspects related to quality, cost and time, and provide the opportunity to understand progress and, consequently, to take corrective actions where necessary. Monitoring and evaluation can also be used to evaluate the success of the city resilience building efforts through performance indicators established within the DRR action plan and to measure their impacts. Measuring impact can be a major challenge without an incident of expected scale and form. Therefore, it is paramount to devise monitoring and evaluation tools to measure impact and success.

Monitor, follow-up and evaluate the Action Plan

1. Formulate a comprehensive monitoring and evaluation (M&E) plan to measure the performance of the DRR activities. The M&E plan should identify the monitoring points and the responsible departments for M&E.
2. Develop M&E tools and approaches to appraise the DRR projects. The tools and approaches should consider expected dates of completion, expected quality standards, cost targets, sustainability and environmental targets, level of impact, and all other performance indicators identified within the DRR action plan.
3. Establish a local level reporting system to convey the results and best practices among other local governments and to national level DRR platforms.
4. Customize the identified tool(s) to match local conditions and ensure compatibility with the national level requirements.
5. Ensure participation of all relevant stakeholders and encourage a multistakeholder platform to include feedback mechanisms and opportunities.
6. Identify corrective actions based on M& E and revise the action plan based on feedback.

Disseminate and promote the Action Plan

1. Review progress regularly at the local level and contribute to national and regional progress reviews by sharing information with the national government.
2. Develop a communications strategy (internal and external) to inform local authorities, the community and different actors about gaps, problems, and achievements.
3. Put in place communication mechanisms that allow local leaders and the community to provide input, suggestions, and comments.

Examples

Monitoring and Evaluation of Rotterdam Climate Proof Methodology

As cities around the world look for ways to implement the Paris Declaration, C40 is showcasing 100 cities that are working to increase their resilience to the climate change impacts. Among them, the City of Rotterdam has set up a Rotterdam Climate Proof Programme to develop resilience by 2025. The foremost aim of the Programme is to sustainably protect the city against flooding, inside and outside of the levees. In addition to flood management, the city will focus on other impacts of climate change such as heat waves, increased heavy precipitation, groundwater salinization, changing options for transport by water and increased volatility of groundwater levels. For the implementation of the Programme, the City of Rotterdam has undertaken the following actions: construction of 20,000 m² of green roofs and a subsidy scheme to building owners; design of the first water plaza and the initiation of the participation program; provision of 40,000 m³ of additional water storage space and extra water reservoir (partially constructed); design of the first terraced levee; design of Blue Connection (a water connection of 13 kilometers between a new landscape park and the south of Rotterdam having recreational and water retention storage functions); and construction of the floating pavilion (in process).

As part of the Rotterdam Adaptation Strategy, results are evaluated through the following instruments:

a) Climate Atlas: This involves an outline of the region-specific impact of climate change, scenarios, and the implemented measures;

b) Barometer: The climate barometer is a communication-oriented monitoring tool that will provide insight into the climate resilience level of Rotterdam;

c) Monitoring: Physical resilience measures are monitored and their effects on the speed and scope of the expected climate change are recorded. The City of Rotterdam is considering developing a dashboard to measure the progress and see the correlation between all programme elements;

d) Route Planner: The Route Planner defines the milestones, actions and options for each theme in the course of time;

e) Climate Tool Box: This involves area-specific adaptation measures in support of overall disaster risk management plans;

f) Assurance: Climate change resilience is embedded in spatial planning, area development, implementation and policy guidelines. Existing instruments and methods are tested for possible alignment, and research is conducted to investigate whether it is effective in providing assurance in the form of a policy framework.

For more information on this case study, please see: http://www.c40.org/case_studies/climate-proof-adaptation-strategy-2010.

Monitoring and Evaluation in DRMMP: Disaster Risk and Resiliency Indicators (DRRI)

Earthquake Megacities Initiative's (EMI) Disaster Risk Management Master Planning (DRMMP) approach includes implementation, monitoring, and evaluation tools to track the progress of implementation. One of these tools is the qualitative Disaster Risk and Resiliency Indicators (DRRI) that established initial benchmarks to measure what extent risk reduction approaches have been mainstreamed in the organizational, functional, operational and development systems and processes of local governments (EMI and MCCGM 2011b). DRRI indicators are linked to the HFA 2005-2015, and they aim to understand how well the authority is performing in mainstreaming DRR into different sectors based on predefined benchmarks and performance targets. The scores of the DRRI are derived from a self-assessment along key functional activities/policies undertaken by DRMMP focus groups.

One way of administering the self-evaluation is through an active display of results where the participants cast their votes (via remote keypads) for each indicator and discuss their evaluation. Engaging with the participants in such a way helps to reduce initial apprehension by minimizing the fear of data manipulation as well as providing the conditions for communication to take place around key issues.

Photo:EMI, KIT, CAPRA, CIMNE, GEM.

Evaluation of the DRI indicators (through an adapted Scorecard) in Lalitpur, Nepal using key remote pads to promote communication and discussions in the scoring of the indicators among the focus group members.

Source: Adapted from Bendimerad, F.; Zayas, J.; Khazai, B.; and M. K. Borinaga. "Building Disaster Resiliency through Disaster Risk Management Master Planning," in Encyclopedia of Earthquake Engineering. Springer-Verlag: Berlin-Heidelberg and Khazai, B.; Bendimerad, F.; Cardona, O. D.; Carreño, M-L.; Barbat, A. H.; and C. G. Burton. 2015. A Guide to Measure Urban Risk Resilience: Principles, Tools and Practice of Urban Indicators. Earthquake and Megacities Initiative: Quezon City, Philippines.

ANNEXES

Tools and Resources

General Guidance

"All investments in sustainable development should be risk-informed" UN Secretary General, Ban Ki Moon

Sendai Framework for Disaster Risk Reduction 2015-2030

www.preventionweb.net/sendai-framework/sendai-framework-for-drr

The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by UN Member States on 18 March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Miyagi Prefecture, Japan. The Sendai Framework is the first major agreement of the post-2015 development agenda, with seven targets and four priorities for action.

Making Cities Resilient:" My city is getting ready!"

www.unisdr.org/campaign/resilientcities

The website provides information about the Campaign, how to sign up to the Campaign, cities that have signed up, tool kits including the LGSAT, Resilience Scorecard and the Urban/Local Indicators, as well as the Campaign partners.

Global Assessment Report on Disaster Risk Reduction (GAR) – UNISDR (2009; 2011; 2013; 2015)

www.preventionweb.net/english/hyogo/gar/2015/en/home

The 2015 Global Assessment Report on Disaster Risk Reduction (GAR15), Making Development Sustainable: The Future of Disaster Risk Management, is the fourth biennial global assessment of progress which include analysis based on reporting by UN Member States of their progress in implementing the Hyogo Framework for Action 2005-2015 (HFA), the Sendai Framework's predecessor. GAR15 focuses on strengthening governance for DRR, challenges facing DRR and the future for disaster risk management.

Words into Action: Implementation Guides for the Sendai Framework

www.preventionweb.net/sendai-framework/wordsintoaction

This is a practical guide to the application of the Sendai Framework to support implementation, ensure engagement and ownership of action by all stakeholders, and strengthen accountability in disaster risk reduction. These implementation guides build upon the experience of the development and use of the similar "Words into Action" guide created during the Hyogo Framework for Action decade, 2005-2015.

Implementing the Sendai Framework to Achieve the Sustainable Development Goals

www.preventionweb.net/files/50438_implementingthesendaiframeworktoach.pdf

This publication explores the interlinkages between the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals (SDGs). It describes every SDG and its contribution to preventing new disaster risks and reducing existing ones and to strengthening resilience.

The 2030 Agenda for Sustainable Development

www.sustainabledevelopment.un.org/post2015/transformingourworld
This publication deals with the 17 goals that build on the Millennium Development Goals, agreed by all nations that aim to end poverty, hunger and inequality, to take action on climate change and the environment, to improve access to health and education, to build strong institutions and partnerships, and more. Sustainable Development Goal 11 in particular focuses on making cities inclusive, safe, resilient and sustainable.

The New Urban Agenda: Sustainable Cities and Human Settlements for All

www.habitat3.org/the-new-urban-agenda/
This is an action-oriented document that sets global standards of achievement in sustainable urban development, rethinking the way we build, manage, and live in cities by drawing together cooperation with committed partners, relevant stakeholders, and urban actors at all levels of government as well as the private sector.

Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (2014)

www.ipcc.ch/report/ar5/wg2/
The Fifth Assessment Report (AR5) provides a clear and up-to-date view of the current state of scientific knowledge relevant to climate change.

A Compendium of Disaster Risk Reduction Practices in Cities of the Western Balkans and Turkey (UNISDR; WMO, 2013)

www.unisdr.org/we/inform/publications/39825
This collection examines DRM structures as well as urban risk reduction and resilience-building activities in cities of the Western Balkans and Turkey.

Essential 1: Organize for disaster resilience

Put in place an organizational structure with strong leadership and clarity of coordination and responsibilities. Establish disaster risk reduction as a key consideration throughout the City Vision or Strategic Plan."

PLANYC: A Stronger More Resilient New York (The City of New York, 2015)

ww1.nyc.gov/site/sirr/report/report.page
This is a comprehensive plan that contains actionable recommendations both for rebuilding the communities impacted by Hurricane Sandy and increasing the resilience of infrastructure and buildings citywide.

Unlocking Climate Action in Megacities (C40)

www.c40.org/researches/unlocking-climate-action-in-megacities
This report describes the barriers and challenges city governments often face when tackling climate action. It provides the basis for developing a shared understanding that can allow city leaders and key collaborators to work together to

overcome these challenges. The report presents the candid perspective of city practitioners on the key challenges that limit climate action. It provides a window into the reality of implementing climate action in cities. The report aims to provide insight and impetus to allow cities and their partners to form a common understanding and work together to accelerate and expand local climate action.

Building Urban Resilience: Principles, Tools and Practice (WB; AusAID, 2013)

www.preventionweb.net/publications/view/31969
This handbook is a resource for enhancing disaster resilience in urban areas. It summarizes the guiding principles, tools, and practices in key economic sectors that can facilitate incorporation of resilience concepts into the decisions about infrastructure investments and urban management to reduce disaster risks.

Guiding Principles for City Climate Action Planning (UN-Habitat 2015)

www.unhabitat.org/books/guiding-principles-for-climate-city-planning-action/#
National and subnational (e.g., state, provincial) governments that are developing or revising policy frameworks that govern climate resilience, urban development, and local planning processes are encouraged to use the Guiding Principles in order to deliver consistently and effectively.

Urban Governance and Community Resilience Guide on Risk Assessment in Cities – ADPC (2010)

www.adpc.net/v2007/Programs/UDRM/PROMISE/INFORMATION%20RESOURCES/Guidebooks/Default.asp
This series of guidebooks are designed to raise awareness about the challenges local governments face in reducing disaster risk.

Essential 2: Identify, understand, and use current and future risk scenarios

"Maintain up-to-date data on hazards and vulnerabilities. Prepare risk assessments based on participatory processes and use these as the basis for urban development and city's long-term planning goals."

Urban Risk Assessments: Understanding Disaster and Climate Risk in Cities (WB, 2011)

www.worldbank.org/en/topic/urbandevelopment/publication/urban-risk-assessment
This publication brings a common, cost-effective approach to urban risk assessment, which begins with specifying where and how many people are vulnerable to natural hazards, and identifying high-risk infrastructure.

Assessing the Vulnerability of Local Communities to Disasters (UNEP, 2008)

wedocs.unep.org/handle/20.500.11822/7926
This is a risk profile tool to help communities make a rough estimate of their exposure to risks.

HAZUS: Software for Risk Assessment and Modelling of Disasters (FEMA, 2011)

www.fema.gov/hazus
This is a GIS-based software to estimate potential losses from earthquakes, floods, and hurricanes.

DesInventar: Disaster Information Management System

www.desinvantar.net/
DesInventar is a conceptual and methodological tool for the generation of National Disaster Inventories and the construction of databases of damage, losses and, in general, the effects of disasters. As a Disaster Information Management System tool, DesInventar helps to analyze disaster trends and their impacts in a systematic manner.

Sea Level Rise for Cities: Illustration of the scale of potential sea level rise

www.climsystems.com/slr-cities-app
This web application comprehensively shows coastal vulnerabilities through displays alongside population density data. Users can obtain detailed information panels and graphs based upon user-specified locations. The base map depicts the projected sea level rise for the world's oceans in 2100 using 1995 as baseline year.

Coastal Resilience Mapping Portal: A decision support tool

maps.coastalresilience.org
Coastal Resilience is a web-based tool that provides communities, planners, businesses, and officials a step-wise process to guide decisions to reduce the risks of coastal hazards. The coastal resilience approach and mapping provide information of restoration, adaptation and conservation practices around the world.

Essential 3: Strengthen financial capacity for resilience

"Prepare a financial plan by understanding and assessing the significant economic impacts of disasters. Identify and develop financial mechanisms to support resilience activities."

Financing the Resilient City: A Demand Driven Approach to Development, Disaster Risk Reduction and Climate Adaptation (ICLEI, 2011)

www.resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Fronted_user/report-Financing_Resilient_City-Final.pdf
This publication discusses an innovative approach to financing resilience, focusing on requirements for mobilizing large amounts of capital for urban risk reduction, above and beyond what would likely be mobilized through new international adaptation funds.

The Adaptation Fund (UNFCCC)

www.adaptation-fund.org/
Know more about the Adaptation Fund, which was established by the parties to the Kyoto Protocol of the UN Framework Convention on Climate Change to finance adaptation projects and programs in developing countries that are parties to the Protocol.

"Climate finance for cities: How can international climate funds best support low-carbon and climate resilient urban development?" (ODI, 2014)

www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9660.pdf
This paper reviews the approaches taken by multilateral climate funds in the period 2010-2014 to support low-emission and climate resilient development in developing country cities.

Disaster risk assessment and risk financing: A G20/OECD methodological framework (G20; OECD, 2012)

www.oecd.org/gov/risk/g20oecdframeworkfordisasterriskmanagement.htm
This methodological framework for disaster risk assessment and risk financing is intended to help finance ministries and other governmental authorities in developing more effective disaster risk management strategies and, in particular, financial strategies, building on strengthened risk assessment and risk financing.

Resilience.io - A global support network of integrated tools and collaboration for financing and decision making for resilience

www.resilience.io/
An open-source, integrated human-ecology-economics systems platform that provides decision aids for resilient disaster risk sensitive planning, policy-making, investment and procurement for city-regions globally. It is designed as a computer-based platform that provides an integrated systems view of a city-region.

Investing in Urban Resilience: Protecting and Promoting Development in a Changing World (WB, 2016)

www.preventionweb.net/files/50628_urbanresilienceflagshipreport.pdf
The report highlights the need for investment in resilience, how cities can take action to build resilience, and how, by investing in resilience, development gains can be protected to create a safer, more prosperous future.

Incentives for Reducing Disaster Risk in Urban Areas (ADB, 2016)

www.adb.org/sites/default/files/publication/185616/disaster-risk-urban.pdf
This document summarizes the experiences in three case study areas—Da Nang in Viet Nam, the Kathmandu Valley in Nepal, and Naga City in the Philippines — concerning incentives for disaster risk reduction. Targeted at national and city governments, this summary document sets out what incentives are and how they are currently used in the three urban areas to encourage investment in disaster risk reduction.

Financial Management of Flood Risk (OECD, 2016)

www.preventionweb.net/publications/view/49826
This publication extends OECD's work by applying the lessons from its analysis of disaster risk financing practices to provide guidance when dealing with floods.

Financial Instruments for Managing Disaster Risks Related to Climate Change (OECD, 2016)

www.preventionweb.net/publications/view/48509
This article provides an overview of the potential implications of climate change for the financial management of disaster risks. It outlines the contribution of insurance to reducing the economic disruption of disaster events and policy approaches

to supporting the penetration of disaster insurance coverage and the capacity of insurance markets to absorb disaster risks, including through the use of capital markets instruments and international co-operation in risk pooling. It concludes with a number of recommendations for improving the financial management of disaster risks in the context of climate change.

Essential 4: Pursue resilient urban development and design

"Carry-out risk informed urban planning and development based on up-to-date risk assessments with particular focus to vulnerable populations. Apply and enforce realistic risk compliant building regulations."

Reducing Disaster Risk by Managing Urban Land Use: Guidance Note for Planners (ADB, 2016)

www.adb.org/publications/reducing-disaster-risk-urban-land-use-guidance-notes
This document provides guidance for urban planners on how to employ land use management-related tools that are at their disposal — land use planning techniques, development control instruments, greenfield development, and urban redevelopment — to reduce disaster risk and contribute to strengthening urban resilience and sustainable urban development.

Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century (WB;GFDRR, 2011)

www.gfdrr.org/sites/gfdrr/files/urban-floods/urbanfloods.html
This book provides forward-looking operational assistance to policy makers and technical specialists in rapidly expanding cities of the developing world on how best to manage the flood risks. It takes a strategic approach, in which appropriate risk management measures are assessed, selected and integrated to both inform and involve the full range of stakeholders.

The Challenge of Slums: Global Report on Human Settlements (UN-Habitat, 2003)

www.unhabitat.org/?mbt_book=the-challenge-of-slums-global-report-on-human-settlements-2003
This book presents the first global assessment of slums, emphasizing their problems and prospects. It examines the factors that underlie the formation of slums -their social, spatial and economic characteristics and dynamics - and evaluates the principal policy responses.

Background Papers to the Global Assessment Reports 2009, 2011, 2013, and 2015

www.unisdr.org/we/inform/gar
Multiple background papers to the Global Assessment Reports have investigated the role of urban planning and development on disaster risk reduction. Among them are:

- Dodman, Hardoy and Sattherwaite (2009). Urban development and intensive and extensive risk;
  Johnson et al. (2012). Private sector investment decisions in building and construction: increasing, managing, and transferring risks;

- Johnson (2011). Creating an enabling environment for reducing disaster risk: Recent experience of regulatory frameworks for land, planning and building in low and middle -income countries;
- Ingrige and Amarathunga, (2011). Minimizing flood risk accumulation through effective private and public sector engagement;
- Gencer (2013). The impact of globalization on disaster risk trends: a macro and urban scale analysis; and
- King et al. (2015). Land use planning for disaster risk reduction and climate change adaptation: operationalizing policy and legislation at local levels.

Essential 5: Safeguard natural buffers to enhance the protection functions offered by natural ecosystems

"Identify, protect, and monitor natural ecosystems within and outside the city geography and enhance their use for risk reduction."

Climate Change and Cities: Second Assessment Report of the Urban Climate Change. Research Network (ARC3-2) (UCCRN, 2016)

www.uccrn.org/arc3-2/

The ARC3.2 Report presents downscaled climate projections for approximately 100 cities and catalogues urban disasters and risks, along with the effects on human health in cities. ARC3.2 gives concrete solutions for cities in relation to mitigation and adaptation; urban planning and design; equity and environmental justice; economics, finance, and the private sector; urban sectors such as energy, water, transportation, housing and informal settlements, and solid waste management; and governing carbon and climate in cities.

Flood Plain Management Plan for the City of Venice – Venice City Council (2009)

https://www.venicegov.com/government/engineering-stormwater/flood-information

This plan of the City of Venice in Florida, U. S. is a supplement to the county-wide Local Mitigation Strategy (LMS) and regional floodplain management plan 2010-2015.

Adapting Urban Water Systems to Climate Change (ICLEI; IWA; SWITCH; UNESCO,2011)

www.iclei-europe.org/fileadmin/templates/icleieurope/files/content/Topics/Water/SWITCH_Adaption-Handbook_final_small.pdf

This is a handbook for decision makers at the local level on the key areas of vulnerability of urban water systems to climate change.

Green Infrastructure and Post-Disaster Recovery (APA)

www.planning-org-uploadedmedia.s3.amazonaws.com/legacy_resources/research/postdisaster/briefingpapers/pdf/greeninfrastructure.pdf

This report includes four (4) key points in support of green infrastructure for post-disaster recovery followed by resources for incorporating green infrastructure into long-term recovery.

Exploring nature-based solutions – The role of green infrastructure in mitigating the impacts of weather and climate change-related natural hazards (EEA, 2015)

www.weadapt.org/sites/weadapt.org/files/eea_exploring_nature-based_solutions.pdf
This is a report of a study that explores and demonstrates how green infrastructure contributes to mitigating adverse effects of extreme weather- and climate-related events at the European scale.

Essential 6: Strengthen institutional capacity for resilience

"Understand institutional capacity for risk reduction including those of governmental organizations, private sector, academia, professional and civil society organizations, to help detect and strengthen gaps in resilience capacity."

Strengthening Institutional Capacity Development for CBDRM - Q & A Guide for Local Authorities in Asia (ADPC; UNESCAP; ECHO)

www.adpc.net/v2007/Programs/CBDRM/INFORMATION%20RESOURCE%20CENTER/CBDRM%20Publications/2008/final_QandA_23nov.pdf
This guide for local government units has three major parts, namely; 1) Institutionalizing a Disaster Risk Management Office, 2) Mainstreaming Disaster Risk Reduction in Land-Use Planning, and 3) Enhancing Community-based Early Warning System, Communication Protocol, and Evacuation Procedures with FAQs on disaster risk reduction in land use planning.

UNISDR Asia Community-based Disaster Risk Reduction for Local Authorities (ADPC; UNESCAP; European Commission Humanitarian Aid, 2006)

www.unisdr.org/files/3366_3366CBDRMShesh.pdf
This is a workbook designed to help local authorities to build the capacity to implement communitybased disaster risk management.

"Building Community Disaster Resilience through Private-Public Collaboration" (NAP, 2011)

www.ametsoc.org/boardpress/cwce/docs/profiles/hookewilliamh/building-community-disasterresilience.pdf
This report addresses community resilience to disasters and responsibilities delineated in effective privatepublic collaboration to enhance community level efforts.

Developing Pre-Disaster Resilience Based on Public and Private Incentivization" (MMC; CFIRE, 2015)

www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab107566.pdf
This paper provides a catalogue of existing programs for different hazards that private and public-sector stakeholders can evaluate, and then modify or expand to develop incentives.

"The Nongovernmental Sector in Disaster Resilience: Conference Recommendation for a Policy Agenda" (RAND, 2011)

www.rand.org/content/dam/rand/pubs/conf_proceedings/2011/RAND_CF282.pdf
This report includes lessons from the management of recent disasters underscoring challenges that confront federal, state, and local entities in coordinating with and leveraging the strengths of nongovernmental organizations (NGOs) in disaster recovery.

Essential 7: Understand and strengthen societal capacity for resilience

"Identify and strengthen social connectedness and culture of mutual help through community and government initiatives and multimedia channels of communication."

Community-based disaster risk management for local authorities (ADPC, 2006)

www.unisdr.org/files/3366_3366CBDRMShesh.pdf
This is a workbook for local authorities introducing the concept and practice of communitybased disaster risk management.

Town Watching Handbook for Disaster Education: Enhancing Experiential Learning (EU; Kyoto University; UNISDR Asia and Pacific, 2009)

www.preventionweb.net/publications/view/12062
This is a handbook to facilitate the engagement of school children and communities in risk reduction activities.

Leading Resilient Development: Grassroots Women's Priorities, Practices and Innovations (UNDP, 2011)

www.undp.org/content/dam/aplaws/publication/en/publications/women-empowerment/leadingresilient- development---grassroots-women-priorities-practices-and-innovations/f2_GROOTS_Web.pdf
This booklet offers an atypical perspective on grassroots women as leaders and active agents of strategies that advance disaster risk reduction and long-term resilience.

VISUS: Enhancing School Safety (UNESCO; University of Udine)

www.unesco.org/new/en/natural-sciences/special-themes/disaster-risk-reduction/schoolsafety/safety-asssessment/method-visus/
This is a methodology to assess the safety of educational facilities worldwide and aid decision makers in planning for interventions.

Essential 8: Increase infrastructure resilience

"Develop a strategy for the protection, update and maintenance of critical infrastructure. Develop risk mitigating infrastructure where needed."

The Value of Green Infrastructure – A Guide to Recognizing Its Economic, Environmental and Social Benefits

www.cnt.org/sites/default/files/publications/CNT_Value-of-Green-Infrastructure.pdf
This guide distills key considerations involved in assessing the economic merits of green infrastructure practices.

The Hospital Safety Index (PAHO; WHO; EPDR, 2008)

www.paho.org/disasters/index.php?option=com_content&view=article&id=964&Itemid=911
A low-cost reliable tool, providing decision makers with an overall idea of a hospital's ability to remain functioning in emergencies and disasters. It consists of a manual and forms for assessing safety.

Adaptation and Planning Strategies to Mitigate the Impact of Climate Change Induced Sea Level Rise, Flooding and Erosion (AECOM, 2016)

www.unisdr.org/we/inform/publications/49459
This is a report on risk assessment of climate change, induced disasters across Australia.

Building resilient infrastructure – Australian Business Roundtable for Disaster Resilience & Safer Communities (DELOITTE, 2016)

www.australianbusinessroundtable.com/au/assets/documents/Report%20-%20Building%20Resilient%20Infrastructure/Report%20-%20Building%20resilient%20infrastrcuture.pdf
This report assesses the economic cost of the social impacts of Australia's natural disasters and the planning and approval process for new infrastructure.

Rebuilding for resilience: Fortifying infrastructure to withstand disaster (PWC, 2013)

www.pwc.com/gx/en/psrc/publications/assets/pwc-rebuilding-for-resilience-fortifyinginfrastructure-to-withstand-disaster.pdf
This report is presented by PwC, a network of independent firms that are committed to working together to provide quality service offerings for clients throughout the world. The findings are relevant for cities, regions, and businesses the world over as they prepare to face the growing risks of natural disaster, compounded by the mounting challenges of the 21st century—as well as for those currently rebuilding in the aftermath of a disaster. It includes six key recommendations for a new global framework for disaster risk reduction through the lens of infrastructure

Transit-Oriented Development Standards (ITDP, 2013)

www.itdp.org/publication/tod-standard/
The Standard outlines eight core principles of urban design and land use, each supported by specific performance objectives and easily measurable indicators, or metrics.

Essential 9: Ensure effective preparedness and disaster response

"Create and regularly update preparedness plans, connect with early warning systems and increase emergency and management capacities."

A Framework for Major Emergency Management (Department of the Environment, Heritage and Local Government, Ireland, 2015)

www.mem.ie/wp-content/uploads/2015/05/A-Framework-For-Major-Emergency-Management.pdf
This document produced in Ireland is designed to enable principal response agencies to prepare for and carry out a coordinated response to major emergencies resulting from events such as fires, transport accidents, hazardous substance incidents and severe weather.

Shake Out Drill Manual for Government Agencies and Facilities – Earthquake Country Alliance, California, U.S.A.

www.shakeout.org/downloads/ShakeOutDrillManualGovernment_v2.pdf
This is a manual containing three levels of earthquake drills and preparedness activities for government agencies and facilities.

State Earthquake Emergency Plan – SES (City of Victoria, Quake Safe Australia, 2016)

www.ses.vic.gov.au/em-sector/em-planning
This is an emergency plan that provides strategic guidance for effective emergency management of earthquake events in the city of Victoria, Australia.

Ready New York: Preparing for Emergencies in New York City (Office of Emergency Management)

www.nyc.gov/html/oem/downloads/pdf/household_guide.pdf
This is a guide for citizens and household on planning for emergencies with lists of what to do and where to get information
.

Implementing a Hazard Early Warning System, Shanghai (GFDRR; World Bank, 2011)

www.preventionweb.net/files/24259_implementingearlywarningsystems1108.pdf
This report summarizes how to implement multi-hazard early warning systems based on best practices in the hydro-meteorological community.

Are You Ready? An In-depth Guide to Citizen Preparedness (FEMA)

www.fema.gov
This is the most comprehensive source on individual, family and community preparedness from the Federal Emergency Management Agency of the U,S. recovery.

Essential 10: Expedite recovery and build back better

"Establish post-disaster recovery, rehabilitation, and reconstruction strategies that are aligned with long-term planning and provide an improved environment for the city."

International Recovery Platform (IRP)

www.recoveryplatform.org/resources/
Consult and learn from the many resources on the IRP website, including case studies, tools and guidelines, recovery cases and reports, and guidance notes.

Methodological Guide for Post-Disaster Recovery Planning Processes – Guidelines and actions for national, regional and local governments" (UNDP; EC, 2011)

www.preventionweb.net/files/32306_32306guametodolgicalparaprocesosdepl.pdf
This guide details the steps towards the preparation of national, regional and local institutional structures and the necessary policies, mechanisms and instruments. Also included are formulating guidelines, reach institutional agreements and arrangement for post-disaster process.

Post Disaster Recovery Framework (2016 – 2020) – Nepal Earthquake 2015 (Government of Nepal; GFDRR, 2015)

www.gfdrr.org/sites/default/files/publication/Nepal%20PDRF%20Report.pdf
This Framework document encapsulates the vision and strategic objectives that guide recovery after the devastating earthquakes that happened in April-May 2015. In addition, it encapsulates the policy and institutional frameworks for recovery and reconstruction, as well as outlining implementation arrangements, projected financial requirements and immediate next steps necessary to ensure implementation of the Framework, of recovery and reconstruction activities.

The US National Disaster Recovery Framework (FEMA)

www.fema.gov/national-disaster-recovery-framework
This National Disaster Recovery Framework (NDRF) was developed by the Federal Emergency Management Agency (FEMA) in accordance with the Post-Katrina Emergency Management Reform Act of 2006. The same law instituted that the management structure can be replicated at state, tribal, and local levels of government.

Shelter and Settlements Response in Urban Emergencies (ALNAP; RedR, 2016)

www.alnap.org/resource/22797
This document captures the key messages, lessons and experiences on the topic of shelter in urban emergency response, offering case studies and references to further readings.

Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters (WB; GFDRR, 2010)

www.gfdrr.org/sites/gfdrr.org/files/SaferHomesStrongerCommunitites.pdf
This is a resource for reconstructing safer homes and stronger communities after natural disasters. It covers the aspects of reconstruction: organization, execution and funding.

About Making Cities Resilient: “My city is getting ready!”

To raise commitment among local decision makers and city leaders, in 2010 UNISDR and its partner organizations launched the global campaign Making Cities Resilient: “My city is getting ready!” The objectives of the Campaign are to increase understanding and encourage commitment by local and national governments to make disaster risk reduction and resilience and climate change a policy priority and to bring the Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals and the New Urban Agenda closer to local needs. The Campaign spans a growing global network of engaged cities, provinces and municipalities of different sizes, characteristics, risk profiles and locations, that can help and learn from each other, enhance knowledge, and transfer expertise and technical support to achieve the objective of building resilience.

The “Ten Essentials for Making Cities Resilient” form the guiding principles for these commitments, helping to establish benchmarks for disaster resilience in cities.

Mr. Robert Glasser with Mayor of Quito Mr. Mauricio Rodas Espinel at Habitat III in Quito, 2016.

Acronyms

ACSAD	Arab Center for the Study of Arid Zones and Dry Lands
ADPC	Asian Disaster Preparedness Centre
AECOM	Architecture, Engineering, Consulting, Operations Management (Fortune 500 company)
ASEAN	Association of Southeast Asian Nations
ASEZA	Special Economic Zone Authority (Aqaba, Jordan)
BCA	Benefit Cost Analysis
CADRI	Capacity for Disaster Reduction Initiative (UNDP, UNISDR and OCHA inter-agency initiative)
CI	Core Indicators
CORILA	Consorzio Ricerche Laguna (Venice, Italy)
CRED	Centre for Research on the Epidemiology of Disasters (Catholic University of Louvain, Brussels)
CRF	Calamity Relief Fund
CUDRR+R	Center for Urban Disaster Risk Reduction and Resilience
DRM	Disaster Risk Management
DRMMP	Disaster Risk Management Master Plan
DRR	Disaster Risk Reduction
ECHO	European Commission's Humanitarian Aid Office
EM-DAT	International Disaster Database, CRED
EMI	Earthquake and Megacities Initiatives
EOC	Emergency Operations Centre
FAO	Food and Agriculture Organisation
FEMA	Federal Emergency Management Agency (USA)
GAR	Global Assessment Report on Disaster Risk Reduction (UNISDR)
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System
GNDR	Global Network of Civil Society Organisations for Disaster Reduction
HFA	Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters
ICLEI	Local Governments for Sustainability
IID	Institute for International Development (Adelaide, Australia)

ILO	International Labor Organisation
INEE	Interagency Network on Education in Emergencies
INSARAG	International Search and Rescue Advisory Group
IPCC	Intergovernmental Panel on Climate Change
IRP	International Recovery Platform
LG-NET	Local Government Network (India)
LG-SAT	Local Government Self-Assessment Tool (see Annex 1)
MCGM	Municipal Corporation of Greater Mumbai
NEHRP	National Earthquake Hazards Reduction Programme (USA)
NGO	Non-Governmental Organisation
OECD	Organisation of Economic Cooperation and Development
PAHO	Pan American Health Organisation, WHO Regional Office
RICS	Royal Institution of Chartered Surveyors
SES	State Emergency Service (Victoria, Australia)
SMART	Stormwater Management Road Tunnel (Kuala Lumpur, Malaysia)
SMEC	Snowy Mountains Engineering Corporation (professional services firm, Australia)
SWITCH	Solar and Wind Initiatives Towards Change (ICLEI)
UCLG	United Cities and Local Governments
UNDAC	United Nations Disaster Assessment and Coordination
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
UNISDR	United Nations International Strategy for Disaster Reduction
URA	Urban and Rural Areas
WB	World Bank
WCSDA	World Cities Scientific Development Alliance (China)
WHO	World Health Organisation

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The Ten Essentials for Making Cities Resilient

1. Organize for disaster resilience. Put in place an organizational structure with strong leadership and clarity of coordination and responsibilities. Establish Disaster Risk Reduction as a key consideration throughout the City Vision or Strategic Plan.
2. Identify, understand, and use current and future risk scenarios. Maintain up-to-date data on hazards and vulnerabilities. Prepare risk assessments based on participatory processes and use these as the basis for urban development of the city and its long-term planning goals
3. Strengthen financial capacity for resilience. Prepare a financial plan by understanding and assessing the significant economic impacts of disasters. Identify and develop financial mechanisms to support resilience activities.
4. Pursue resilient urban development and design. Carry out risk-informed urban planning and development based on up-to-date risk assessments with particular focus on vulnerable populations. Apply and enforce realistic, risk compliant building regulations
5. Safeguard natural buffers to enhance the protective functions offered by natural ecosystems. Identify, protect and monitor natural ecosystems within and outside the city geography and enhance their use for risk reduction
6. Strengthen institutional capacity for resilience. Understand institutional capacity for risk reduction including those of governmental organizations; private sector; academia, professional and civil society organizations, to help detect and strengthen gaps in resilience capacity.
7. Understand and strengthen societal capacity for resilience. Identify and strengthen social connectedness and culture of mutual help through community and government initiatives and multimedia channels of communication.
8. Increase infrastructure resilience. Develop a strategy for the protection, update and maintenance of critical infrastructure. Develop risk mitigating infrastructure where needed.
9. Ensure effective preparedness and disaster response. Create and regularly update preparedness plans, connect with early warning systems and increase emergency and management capacities. 10. After any disaster, ensure that the needs of the affected population are placed at the centre of reconstruction, with support for them and their community organisations to design and help implement responses, including rebuilding homes and livelihoods.
10. Expedite recovery and build back better. Establish post-disaster recovery, rehabilitation, and reconstruction strategies that are aligned with long-term planning and providing an improved city environment.

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