



Complex interactions between urban population dynamics, social processes and a wide variety of natural hazards are increasing the vulnerability of Latin American cities to disaster risk. So how are cities in the region aiming to strengthen disaster risk management?

URBAN DISASTER RISK MANAGEMENT IN LATIN AMERICAN CITIES

SUMMARY

In Latin America, the most urbanised region in the world, serious problems of poverty and inequality persist. 111 million urban dwellers live in informal settlements that are highly vulnerable to disasters. What is more, 80% of the impacts of disasters in the region are felt in the cities, affecting the poorest populations hardest. This Guide begins by describing the complex interaction between processes of urbanisation and natural hazards that generate and intensify disaster risk in Latin America. It then provides a panorama of the evolution of urban disaster risk management in the region, including examples of key achievements towards building more resilient cities. The Guide assesses which contextual factors have enabled these successes and draws out the main lessons to be considered in other regions. Finally, it presents key publications and organisations to link readers to additional resources to learn more.



PANORAMA OF URBANISATION IN LATIN AMERICA

Latin America is home to almost 600 million people. Nearly 80% of this population lives in cities, making Latin America the most urbanised region in the world. The principal mega cities in Latin America are the Mexico City, Sao Paulo, Buenos Aires and Rio de Janeiro - all home to more than 10 million people.¹ Lima, Bogota, Santiago de Chile and Belo Horizonte have populations between 5 and 10 million.

Urbanisation processes began suddenly between 1950 and 1990, leading to environmental degradation and rising social inequity. Even though the region has made considerable progress to reduce poverty over the last 10 years, informal settlements are home to

¹See: UNHABITAT. 2009. *Global Urban Indicators: Selected Statistics*. UNHABITAT, Nairobi. In particular, see Table 8 'Proportion of Urban Population Living in Slums 1990-2010, by Region and Sub-Region'.

KEY LESSONS LEARNED

The relationship between urban poverty and disaster risk is conditioned by the capacity of city and local governments to plan and regulate urban development using disaster risk management approaches.

By incorporating DRM into urban planning, governments can promote equitable urbanisation processes that reduce vulnerability and contribute to sustainable development goals.

Resettlement programmes are probably the most complex examples of urban risk management in Latin America given that they include components of land planning, information, training and regulation.



some 111 million people in the region's urban areas, providing concrete evidence of the severity and persistence of inequality across Latin America. This inequality is also demonstrated by huge disparities in income, substantial unemployment rates and an abundance of informal labour; it is exacerbated by other factors that include the education divide, weakness in social protection systems and increasing family sizes amongst poorer populations. Living in an urban slum reduces an individual's access to work and education opportunities and basic services, and increases exposure to violence and vulnerability to disasters.

On-going challenges relate to improving living conditions for the urban poor and cultivating the political will required to carry out improvements to infrastructure, social services and social amenities for families, such as installations and constructions for education, recreation, culture, health and well-being. To achieve these goals, land policy must promote strategies to rectify existing patterns of urban growth, avoid disperse expansion and reduce population density. Likewise, urban planning should make better use of available space and thereby avoid creating further physical and social segmentation.²

Compounding all of these, cities today must also face another major challenge: the 'urbanisation' of disasters. In Latin America, it is the complex interrelations between a diverse variety of natural hazards, urbanisation and social processes, along with other conditions of vulnerability, that explain the character and impacts of disasters in the region's cities today. Yet these dimensions of disaster risk are by no means exclusive to Latin America. Reports for Africa estimate that between 1997 and 2008, 166 large-scale urban disasters affected 3.3 million people. Africa's urban population is expected to rise to 60% of the total population by 2050, with some countries reaching this by 2030. Without the appropriate prevention and mitigation measures in place, a growing number of urban dwellers will face disasters with increasing frequency and intensity. As for Asia, 44.7 million people live in areas exposed to floods. With 7 of the 10 most populous cities in the world, and an urban population expected to double from 1.36 billion to 2.64 billion by 2030,³ adopting integrated strategies for urban disaster risk management is also an urgent task for Asia.

INTRODUCTION TO THE GUIDE: METHODOLOGY AND MEASURING IMPACTS

The research carried out for this Guide consisted of a literature review of technical studies and reports compiled by UN agencies, as well as international and multilateral institutions such as the World Bank, the Economic Commission for Latin America and the Caribbean (ECLAC) and the Inter-American Development Bank (IDB). Reports produced by these organisations – written by both in-house staff and external experts – are high-quality and reliable, and provide applied and comparative research covering different countries in Latin America. The author also consulted [publications from La Red](#) (The Latin American Network of Social Studies in Disaster Prevention). Efforts have been made to ensure that the sources used are as current as possible and available online for easy reference.

Measuring the impact of DRM interventions is complicated by the simple fact of lack of a counterfactual and needing to wait for a major disaster to happen to gauge if the DRM strategies worked as planned. Instead, efforts at measuring results often focus more on process indicators, meaning whether or not specific initiatives or aspects considered to be good DRM practice have been implemented.

At the international level, different sets of measuring and benchmarking efforts exist. One is the Hyogo Framework for Action (HFA) monitoring in which countries self-report on their progress in meeting the agreements. A study by ECHO from 2007 attempted to benchmark country capacity to manage risk.⁴ And another initiative called [Views from the Front Line](#), pushed by civil society through the [Global Network of Civil Society Organisations for Disaster Reduction](#), benchmarks 57 countries worldwide, looking at DRM at the local level. Both of these include Latin American countries, offering readers access to information about progress made by particular countries in the region.

Here we highlight the only evaluation methodology that has been developed specifically for the Latin America region. The methodology, called Indicators for Disaster Risk Management, was developed by the Institute for Environmental Studies ([Instituto de Estudios Ambientales - IDEA](#)) of the National

² UNHABITAT. 2012. [State of Latin American and Caribbean Cities: Towards a New Urban Transition](#). UN-HABITAT. Nairobi.

³ United Nations Population Fund (UNFPA). 2007. [State of World Population 2007. Unleashing the Potential of Urban Growth](#). UNFPA, New York.

⁴ This study is described in: Khamis, M., Osorio, C. 2013. [America del Sur: Una Visión Regional de la Situación de Riesgo de Desastres \(South America: A Regional Vision of the Status of Disaster Risk\)](#). UNISDR, Geneva.



University of Colombia and promoted by the Inter-American Development Bank (IDB) between 2005 and 2010. This system of indicators, which is designed to be easily understood by policymakers and relatively easy to update periodically, is used to “describe comparative levels of risk in different countries and allows for the identification of the principal factors that contribute to the configuration of risk in each country.”⁵ Some countries also have monitoring data available at the sub-national level, including principal urban areas.

The indicators look at levels of risk and vulnerability, as well as countries’ efforts to address risk. The Indicators for Disaster Risk Management represent an assessment of public policy relating to four key areas:

1. Risk identification
2. Risk reduction
3. Disaster management, and
4. Governance and financial protection

For each of these four policy areas, six indicators are used to evaluate the level of disaster management in each country. The overall Indicator for Disaster Risk Management is the average of these four values, and ranks progress in each country as either non-existent, below average, average, above average or optimum. The methodology has enabled a systematic and quantitative benchmarking of Latin American countries during different periods between 1980 and 2008. This methodology has shown that, overall, the Latin American region strengthened its disaster risk management during this period, progressing from ‘non-existent’ to a value between ‘below average’ and ‘average’. The greatest improvements were made in public policy relating to risk identification and disaster management, while further strengthening is required in the areas of risk reduction, financial protection and institutional organisation.⁶

UNDERSTANDING URBAN RISK IN LATIN AMERICA

Disasters caused by natural phenomena have affected around 160 million people in Latin America and the Caribbean over the last three decades. Between 1970 and 2009, nearly 130,000 people lost their lives as a result of disasters across the region. Economic damages reached \$356 billion, and of

those, more than 60% were due to weather-related events, partly related to climate change. What is more, over 80% of losses caused by disasters in Latin America were produced in urban areas. Urban risk in Latin America is driven by two main factors: natural hazards and weak urban management.



Image 1: Slum dwellers in the cities of low- and middle-income nations are among the most vulnerable to risks stemming from natural hazards, disease and inadequate support services. Rocinha, shown here, is the largest *favela*, or slum, in the Brazilian megacity, Rio de Janeiro, and is home to an estimated 250,000 people.

Source: [chensiyuan](#), wikimedia commons

Natural Hazards Risk

The region’s cities face ‘high’ and ‘very’ high disaster risk, as Figure 2 shows. The character of risk in the region’s cities is partly determined by exposure to a wide variety of natural hazards, many of which are intensifying due to global climate change. The most common include:

- Abnormal rainfall or drought periods, phenomena which are associated with the recurrence of [El Niño and La Niña](#). Overall, rainfall patterns have changed across the region, with an increase in rainfall in some areas (southern Brazil, Paraguay, Uruguay, northeast Argentina and northwestern Peru) and a reduction in others (southern Chile, southwestern Argentina and southern Peru). The result is an increased risk of floods and droughts, which can exacerbate existing problems in northern Mexico and northeastern Brazil, among other areas
- Tropical storms and hurricanes are more frequent and intense than in the past, meaning natural hazards are occurring in areas where they never happened before

⁵ Inter-American Development Bank (IDB), Institute for Environmental Studies (IDEA). 2003. [Indicators for Disaster Risk Management: Methodological Fundamentals](#). IDB and IDEA, Manizales; Cardona, O. 2007. [Indicators of Disaster Risk and Risk Management: Program for Latin America and the Caribbean: Summary Report](#). IDB, Washington, DC.

⁶ Cardona, O.D., Carreño, M.L. 2011. [Updating the Indicators of Disaster Risk and Risk Management for the Americas](#). *Journal of Integrated Disaster Risk Management* 1(1).



- Increasing global temperatures are also affecting glaciers. The disappearance of glaciers in South America's Andes mountains, estimated to occur within the next ten to twenty years, will impact on the availability of water, with severe consequences for the inhabitants of cities like Arequipa (Peru), La Paz (Bolivia) and Quito (Ecuador) that depend on snowmelt and the wet moorlands for their freshwater supply
- There is also the risk of sea level rise, salinisation of groundwater sources and coastal flooding. 60 of the 77 most densely populated cities in the region are on the coast. Cartagena (Colombia), Guayaquil (Ecuador) and Havana (Cuba) are particularly vulnerable to these impacts
- Active tectonic plates in Mexico, Central America, the Caribbean, and the northwest and west of South America present a high risk of earthquakes and tsunamis, with those that occurred in Haiti and Chile in 2010 being clear examples
- Major landslides caused by the combination of geological and meteorological events have destroyed vast areas, such as in the highland cities around Rio de Janeiro, including Petropolis, Teresopolis, Nova Friburgo and Itaipava, during 2010

Weak Urban Management

Weather hazards alone do not fully explain the character of disaster risk in Latin American cities. Urban population dynamics and social processes are also highly relevant to understanding how risk is generated and intensified within different contexts.⁷ Furthermore, urban risk increases where city governments exhibit weak capacities for planning and regulating urban development.

The failure of urban authorities to regulate building standards, implement effective land-use planning strategies and provide low-cost housing options has often resulted in the imprudent modification of urban spaces and natural environments and the expansion of slums. As a consequence of inequalities in access to land, poor and excluded populations are frequently forced to occupy areas unsuitable for human settlements,⁸ such as on the edges of river channels, river fluvial terraces

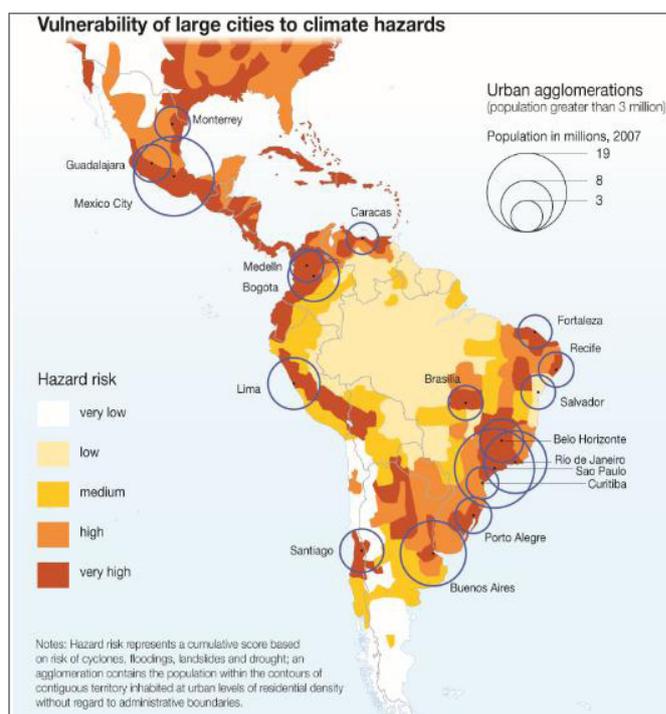


Image 2: Level of risk in Latin America's main cities.
Source: UNEP, ECLAC and UNEP/GRID-Arendal. 2010. [Vital Climate Change Graphics for Latin America and the Caribbean 2010](#). UNEP, ECLAC, UNEP/GRID-Arendal, Panama.

or riverbanks where frequent flooding and landslides occur and where the soil structure and buildings are extremely vulnerable to earthquakes.⁹ The majority of housing in informal settlements is low-quality and precarious, often lacking basic infrastructure and secure access routes, and frequently occupants only have access to informal land tenure. In many cases, these settlements are considered illegal because they do not comply with existing urban building regulations and lack land titles. This 'illegal' nature restricts support and interventions from government authorities.

Examples from the region's cities help put these problems into relief. Much of the housing in Caracas, Venezuela, for example, is built on slopes crossed by gorges leading to the Guaire, the city's main river. Low-income groups have settled on unstable land in these gorges where torrential rainfall has caused massive landslides and floods killing hundreds of people. After repeat flooding in the city of Santa Fe, Argentina, in 2003 and again in 2007, city authorities recognised that for the last 50 years there had been no urban land policy and

⁷ UNHABITAT, ISDR, UNFPA. 2012. [Linkages Between Population Dynamics, Urbanisation Processes and Disaster Risks: A Regional Vision of Latin America](#). UNFPA, New York; UNISDR. 2009. [Global Assessment Report on Disaster Risk](#). UNISDR, Geneva. In particular Chapter 4 [The Heart of the Matter: The Underlying Risk Drivers](#).

⁸ For a comprehensive discussion of the relationship between urbanisation and disaster risk, see: International Federation of Red Cross and Red Crescent Societies. 2010. [World Disasters Report 2010: Focus on Urban Risk](#). IFRC, Geneva.

⁹ More information on the impact of public policy on land occupation and urban land management is provided in: Mansilla, E. Riesgo Urbano y Políticas Públicas en América Latina: La Irregularidad y el Acceso al Suelo (Urban Risk and Public Policy in Latin America: Irregularities and Access to Land). In: UNISDR. 2011. [Global Assessment Report on Disaster Risk Reduction](#). UNISDR, Geneva.



that consequently people had settled where and how they could, prioritising proximity to workplaces or social networks.

Managua, the capital city of Nicaragua, is located on a strip of land where there are 18 active faults and a chain of volcanoes. Despite these high risk conditions, urban planning and development processes have not incorporated vulnerability assessments, zoning studies or adequate supervision of construction norms. As a result, in this city of 1.4 million people, 79% of houses are of bad or mediocre construction quality and 18% need complete renovation. About 45,000 families live in 274 informal settlements which lack access to water, sanitation and electricity. It is estimated that each year in Managua, 3,000 homes are built without authorisation and thus with no oversight of the quality of construction.¹⁰

During [Hurricane Mitch](#) in 1998, the cities of Tegucigalpa and Comayagua in Honduras were seriously affected. Most damage was concentrated around the four rivers that cross these cities. Inadequate city infrastructure, especially water, sanitation and drainage, lack of zoning codes, the concentration of services and infrastructure in only a few areas, lack of official prevention and mitigation strategies, together with an inappropriate management of river basins, contributed to the vulnerability of these areas.

Quito, in Ecuador, is another city where hazards and vulnerability combine to create risk. The city is built on very steep slopes at the foot of the Pichincha volcano. Its population has increased four-fold over the last 30 years and a combination of problems - economic crisis, debt, rapid population growth and a lack of planning - has led to legal and illegal occupation of slopes. The costs of providing services and infrastructure to these areas are very high, especially for illegal settlements. The lack of sewers and drainage systems increases the risk of floods, while the lack of proper waste collection systems results in waste accumulation in ravines and gorges, clogging natural water flow and generating floods and landslides.¹¹

BUILDING RESILIENT CITIES IN LATIN AMERICA

The Network for the Social Study of Disaster Prevention in Latin America (*La Red de Estudios Sociales en Prevención de Desastres en América Latina* – LA RED¹²) has been one of the main driving forces behind the evolution of DRM approaches in Latin America, which has led to real changes in how disasters are being managed in cities across the region. LA RED was established in 1992 by a group of 16 disaster researchers from Canada, Colombia, Costa Rica, Ecuador, Mexico and Peru, with the aim of creating collaborative links between specialist organisations. Between 1993 and 1994, LA RED published 14 books on diverse issues linked to disaster management, as well as nine issues of the journal [Desastres y Sociedad](#) (Disasters and Society). These publications provide essential reference material for anyone currently studying disasters because they represent the first efforts at developing a DRM approach appropriate for the Latin American context.

From the 1990s to the present day, LA RED has helped to shape the evolution of DRM in Latin America in the following ways:

- Promoting the development of social approaches to risk assessment and of analytical tools (such as the [DesInventar](#) database)¹³
- Carrying out comparative research projects
- Producing high quality reports and publications
- Organising meetings, workshops and other forums for discussing and disseminating research ideas and findings, in particular creating spaces for Latin American researchers to share experiences with and learn from counterparts working in the northern hemisphere and other regions
- Participating in consultancies and projects funded by international development agencies, LA RED experts and member institutions have been able to promote

¹⁰ Hardoy, J., Pandiella, G. 2009. Urban Poverty and Vulnerability to Climate Change in Latin America. In: [Environment and Urbanization](#) 21(1) 203-224.

¹¹ Fernández, M. A. (Ed.). 1996. [Ciudades en Riesgo, Degradación Ambiental, Riesgos Urbanos y Desastres en América Latina \(Cities At Risk, Environmental Degradation, Urban Risks and Disasters in Latin America\)](#). LA RED, Lima.

¹² For a detailed analysis of the evolution and contributions of Latin American studies to understanding disaster, see: Lavell, A. 2004. La Red de Estudios Sociales en Prevención de Desastres en América Latina, [LA RED: Antecedentes, Formación y Contribución al Desarrollo de los Conceptos, Estudios y la Práctica en el Tema de los Riesgos y Desastres en América Latina: 1980-2004](#) (Network for the Social Study of Disaster Prevention in Latin America LA RED: Background, Formation and Contribution to the Development of Concepts, Studies and Practice on Risks and Disasters in Latin America, 1980 to 2004). La Red, Panama: Inter-American Development Bank. 2003. [The Notion of Disaster Risk: Conceptual Framework for Integrated Management](#). IDB, Manizales. (In particular Chapter 5 'The Concept of Risk: Frameworks and Evolution'): Cardona, O. 2003. [The Need for Rethinking the Concepts of Vulnerability and Risk from a Holistic Perspective: A Necessary Review and Criticism for Effective Risk Management](#) In: Bankhoff, G., Frerks, G., Hilhorst, D. (Ed.). 2003. [Mapping Vulnerability: Disasters, Development and People](#). Earthscan Publishers, London.

¹³ For more information on the [DesInventar](#) database, see the section in this Brief entitled 'Improving Information on Risk'.



innovative proposals for disaster management interventions in the region

- Training and teaching provided by LA RED has been fundamental for the development of high-calibre and well-respected professionals across the region. Two organisations that are members of LA RED - the Southwestern Seismological Observatory ([OSSO](#)) and *Omar Darío* - have been awarded the prestigious [United Nations Sasakawa Award for Disaster Reduction](#).

In Latin America, disaster management practices have evolved from largely top-down relief and response approaches to inter-sectoral disaster risk management strategies. Before the 1990s, disasters were viewed as one-off events unrelated to ongoing social and developmental processes. Government and relief agency interventions were biased toward providing emergency aid and proved to be highly inadequate at dealing with the social, economic and environmental impacts of natural disasters. Gradually this attitude changed towards an emphasis on preparedness measures, such as stockpiling of relief goods, emergency response plans and a growing role for relief agencies such as the Red Cross. While this 'contingency planning' approach certainly improved the efficiency of relief agencies, it did little to address the multiple causes of risk.

Studies conducted during the 1990s by LA RED researchers made significant advances towards providing a more holistic understanding of the complex array of processes that underlie hazardous events. As a result, disasters are no longer viewed as exceptional events created entirely by natural forces but as unresolved problems of development. It is now recognised that physical, social and economic risks that are unmanaged or mismanaged are ultimately what lead to the occurrence of disasters.

Towards the end of the 1990s, the Disaster Risk Management approach emerged as a new paradigm positing risk as the central problem and disasters as a product of this risk. This approach highlights the relationships between risks and disaster with development processes and planning, and, ultimately, with sustainable development objectives. This new approach has been adopted by countries across Latin America and the Caribbean and is promoted by multilateral donors such as the Inter-American Development Bank, the World Bank and the United Nations.

This change in paradigm highlights three key evolutions in the Latin American approach to DRM: i) the recognition that disasters are not just natural; ii) an emphasis on the role of 'vulnerability' in creating risk, as opposed to placing the natural hazard at the centre of analysis; and iii) the hypothesis that the shaping and construction of risk is mainly social and is determined by several types of processes within different geographical and social contexts.

Towards the end of the 1990s, much of the Latin American region began adopting the DRM approach. Following commitments determined in the objectives of the [Hyogo Framework for Action](#) and the launch of the United Nations global campaign [Making Cities Resilient](#), countries and cities in Latin America have implemented diverse strategies for urban risk management adapted to different contexts, in particular in the four main areas of public policy evaluated by the Indicators for disaster management methodology (risk identification; risk reduction; disaster management; and governance and financial protection).

This Guide focuses on three of these four areas. First, within identifying risk, the Guide focuses on how information about risk has been improved. Second, within risk reduction, the focus is on issues related to land planning and integrated slum management. And finally, the section on governance and financial protection includes a particular focus on strengthening institutions. Across the diversity of Latin American DRM responses, these particular areas of policy and practice were selected because they represent some of the areas in which Latin American countries are producing some innovative experiences in terms of the new approach to DRM in the region. In addition, interesting research and policy papers are available in English, and the experiences provide important lessons for other cities of the world.

1. Identifying Risk: Improving Information on Risk

Urban planning and development across Latin America is benefiting from new and improved information on the dynamics, frequency, nature and causes of potential hazards at regional, national and local levels. Detailed risk assessments have also proved to be a key element in comprehensive DRM programming and to provide a basis for decision making by city governments, businesses and citizens alike. Likewise, monitoring and information systems have been extended and improved via institutional collaborations and decentralised networks.



Across the region, diverse experiences of risk assessment and information dissemination are providing some positive results. Some of the most noteworthy examples include:

- Many cities have produced inventories of disasters, damages and losses as a means of assessing and categorising natural disasters and their impacts. [DesInventar](#) is a regional information system that collects and disseminates information on disasters compiled from existing data, newspaper sources and institutional reports. It is available for the majority of Latin American countries, except Brazil, Suriname and Uruguay. The database has played a key role by pioneering the collection and dissemination of detailed information on the variability of risk at the territorial level to diverse cities in the region.¹⁴
 - The Central American Probabilistic Risk Assessment (CAPRA) is an open-source knowledge platform for multi-hazard risk assessment designed to help decision makers estimate the impacts of future disasters and design strategies to mitigate risks. The primary CAPRA product is a series of risk maps. The CAPRA methodology determines risk in a probabilistic manner, such as by taking into account the intensity and frequency of occurrence of hazards over a period of time. These risk maps present quantitative information on the potential losses a country, region or city could face if struck by single or multiple hazards. Initiated in 2008, the CAPRA is presently used by Belize, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru and Saint Lucia.¹⁵
 - In order to monitor and forecast risk, networks of disaster monitoring stations have been extended to various cities including Sao Paulo (Brazil), Medellin (Colombia) and Havana (Cuba). In Argentina, heavy flooding between 1982 and 1983 in the La Plata river basin led to the establishment of a hydrological warning system to produce forecasts based on localised meteorological and hydrological data.¹⁶ The system also helps to coordinate the efforts of national and provincial government agencies and promotes information exchange with the
- four countries located up-river (Bolivia, Brazil, Paraguay and Uruguay). The system transmits information on the likelihood of extraordinary hydro-meteorological events to civil protection and disaster control authorities and, in doing so, has contributed to minimising damages.¹⁷
 - Innovations in risk mapping and hazard/damage scenarios have helped city governments and populations better understand and internalise the risks they face. One notable case is the [Sustainable Cities Programme](#) in Peru, which over 14 years has carried out 178 urban risk studies in 157 cities, benefiting over 5 million inhabitants. The studies have supported decision makers to define strategies for sustainable urban development by incorporating DRM into city planning. Diverse cities, including Mexico City, have carried out physical vulnerability assessments of the city's main buildings and developed damage and loss scenarios for different disaster events. This information has been used to design insurance mechanisms and financial risk transfer tools.¹⁸
 - Specialist technical and scientific institutions have driven forward research into disaster hazards and risk. Leading national research centres include [FUNVISIS](#) in Venezuela, the [Peruvian Institute of Geophysics](#) and the [South American Regional Centre for Seismology](#) (CERESIS) in Peru, the [Institute for Geosciences at Panama University](#), the [School of Geology at the Costa Rica University](#) and the [National Institute for Seismology, Volcanology and Meteorology in Guatemala](#).
 - Various institutions are leading regional collaboration for disseminating information to mitigate and avoid the impacts of natural disasters. These include the [Centre for Regional Information about Disasters for Latin America and the Caribbean](#), the [International Centre for Research on the El Niño Phenomenon](#) in Ecuador, and the [Permanent Commission of the Southern Pacific](#).

¹⁴ For information on the impacts of the *DesInventar* system in the region, the author recommends: Global Risk Identification Programme. 2010. [Establishing and Institutionalizing Disaster Loss Databases in Latin America: Guidelines and Lessons](#). GRIP/UNDP. Geneva.

¹⁵ Building on and strengthening existing initiatives, CAPRA was developed by Latin American experts with the support of the Central American Coordination Centre for Disaster Prevention (CEPREDENAC), the World Bank, the Inter-American Development Bank and the International Strategy of United Nations for Disaster Reduction (UNISDR), in partnership with Central American governments. See: GFDRR. (No Date). [Case Study: Central American Probabilistic Risk Assessment \(CAPRA\)](#). GFDRR, Geneva.

¹⁶ See: 'Argentina: Urban Flood Prevention and Drainage Program' In: Jha, A., Bloch, R., Lamond, J. 2012. [Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century](#). World Bank, GFDR, Washington, DC.

¹⁷ UNISDR. 2006. [Compendium of Early Warning Projects](#). ISDR Platform for the Promotion of Early Warning, Bonn.

¹⁸ World Bank. 2012. [Improving the Assessment of Disaster Risks to Strengthen Financial Resilience](#). World Bank, Washington, DC.



2. Risk Reduction: Land Planning and Integrated Slum Management

Latin American governments have been integrating DRM into land planning processes to implement integrated neighbourhood development plans - including resettlement programmes - in high risk areas. At the same time, risk analysis has been incorporated into project design, investment strategies and decision making processes for future urban development projects.¹⁹ Progress has been made in many cities by updating land use plans with a preventative approach to disasters (see Box 2 for the case of Medellin, Colombia). In addition, hazard risk assessments are being used to support changes in access to secure land tenure, in particular for inhabitants of informal settlements.

Risk reduction is a strategy that forms part of diverse projects aimed at the integrated improvement of informal settlements in the region. Examples include the [Morar Carioca initiative](#), led by the prefecture of the city of Rio de Janeiro, which has been operating in Brazil since 2010 with the aim of improving living conditions for up to 320,000 households in the Rio de Janeiro *favelas* (slums) by 2020. This initiative was developed based on an integral approach to DRM with an emphasis on long-term urban planning, environmental sustainability and better access to basic services. Measures have included setting up a system for planning and controlling the occupation of land.

In Colombia, DRM is a public policy included in land planning and supported by legislation and specific regulations.²⁰ Compared to other Colombian cities, Bogota has made most progress in the implementation of the national DRM strategy, having produced micro-zoning maps that identify 'at risk' areas of land and vulnerable families using information systems that enable monitoring and control of new settlements. Financial mechanisms such as housing subsidies for vulnerable families and grants for institutions specialised in resettlement programmes have also been established.

Various alternative housing options have been tested in the region: the construction of new houses by private firms (in Guatemala and Brazil) and in partnership with private construction firms or specialist non-governmental organisations (in Colombia); assisted community self-builds (in Argentina); housing exchange programmes between families within the same community (Brazil); acquisition of

used housing with legal and technical support (Colombia); and cash compensation schemes in Peru. The existence of various alternatives both facilitates and strengthens resettlement processes and ultimately contributes to reducing exposure and vulnerability of urban families to disaster risk.²¹

Box 2: Medellin - Land Planning and Slum Management in this Resilient City

Medellin is the second largest city in Colombia with 1.8 million inhabitants. Many of the city's poor and highly populated informal settlements - home to some 200,000 people - are constructed on steep hillsides. Every year these settlements suffer from flooding and landslides, and the city is also vulnerable to earthquakes. In 1987, 500 people lost their lives and 3,500 were left homeless as a result of a major landslide. The disaster raised awareness amongst the local population and calls were made for Medellin to become better prepared to face risk.

As a first step, the Municipal System for Prevention, Response and Restoration promoted processes to link DRM strategies with land planning, City Council development plans and economic and social development programming in general. The Municipal System is made up of 12 departments (such as education, investment, civil works and planning) and includes participation from the academic and scientific communities (contracted to carry out risk and vulnerability assessments) and environmental protection agencies, such as the *Mi Rio* (My River) institute. Priority has been given to running citizen education initiatives and broadcasting regular campaigns with the help of mass media companies like *TeleMedellin* and *TeleAntioquia*. The Municipal System is also training community leaders and members of neighbourhood and school committees in emergency response.

Over the past 15 years, the Municipal System in Medellin has been successfully integrating DRM into a range of city development activities including environmental protection, construction, technical and scientific research, education and awareness-raising. Integrated improvement projects have been carried out in high risk areas resulting in the resettlement of families into safer zones. 174 Citizen Emergency Committees have been set up to prioritise and execute projects. In 2008, the Municipal System received US\$ 5 million in funding from the City Council and currently receives additional support from international bilateral and multilateral donors.

Adapted from: Cortes, F. R. 2008. [Colombia: Descentralización de las Actividades de RRD \(Colombia: Decentralisation of DRR Activities\)](#). Ministerio del Interior y de Justicia, Bogota.

²¹ To learn more about these strategies, see the [ELLA Brief: Latin American Experience In Combining Disaster Risk Management With Poverty Reduction](#).

²² World Bank, GFDRR. 2012. [Analysis of Disaster Risk Management in Colombia: A Contribution to the Creation of Public Policies](#). World Bank Colombia, Bogota.

²³ All of these examples are addressed in greater detail in: Correa, E. (Ed). 2011. [Preventive Resettlement of Populations at Risk of Disaster: Experiences from Latin America](#). GFDRR/World Bank, Washington, DC.





3. Governance and Financial Protection: Strengthening Institutions and Governance

Countries across the region have been pushing through legal and institutional reforms in order to transform traditional emergency response frameworks into multi-sectoral and inter-institutional risk reduction systems. Increasingly, DRM is being mainstreamed across government policy and practice, where participative and decentralised approaches are helping to transform the structures and operations of public institutions that for many years have been hierarchical and authoritarian.

Many Latin American countries have set up decentralised national disaster management systems coordinated by national commissions. The reforms implemented in Latin America's DRM systems aim to provide an institutional basis for implementing the Hyogo commitments. Countries opted for implementing a systems approach in order to structure and engage the complex and multiple ensembles of actors, processes and actions that are required for mainstreaming DRM. The systems approach places an emphasis on processes and instruments that facilitate interdisciplinary cooperation between distinct actors in order to embed DRM within existing development spheres. It entails strategies that address each of the phases within the cycle of disasters: prevention, preparedness, response and recovery. To learn more about the institutionalisation and mainstreaming of DRM in public policy in Latin America, read the [ELLA Brief: Institutionalising Disaster Risk Management: Latin America's Systems Approach](#).

Some examples of national disaster management systems include: National Systems for Disaster Risk Management in Peru ([SINAGERD](#)), Panama ([SINAPROC](#)) and Mexico ([CENAPRED](#)); the National Unit for Disaster Risk Management in Colombia ([UNGRD](#)); the National Coordinating Body for Disaster Reduction in Guatemala ([CONRED](#)) and the National Commission for Risk Prevention and Emergency Response in Costa Rica ([CNE](#)). City governments play a key role in the implementation of DRM policy since they are responsible for the design and implementation of strategies and actions within their jurisdictions. This includes ensuring that programmes and

policy are in line with national DRM objectives and guidelines set by the national disaster management systems.

Amongst other measures, these systems have prioritised actions to transfer skills, responsibilities and public funding for DRM to city governments. To achieve this, city governments region-wide have benefited from capacity strengthening in disaster preparedness and management, including training and technical assistance, to ensure that they are able to integrate disaster mitigation and risk reduction into city development processes.²²

Important progress has been made in integrating DRM into public investment systems via a range of methods for risk modelling, assessment and cost-benefit analysis. These systems are helping to ensure that public spending not only prevents and mitigates future risk, but also that direct expenditure on DRM is contributing to longer-term economic and social development goals. Evidence of this can be found in substantial increases in national budgets designated for DRM. These rises in public spending are being capitalised via financial packages aimed at stimulating the economy through investments in infrastructure for risk reduction and other measures that address the underlying causes of risk and support poverty reduction efforts.

These changes are fostering greater autonomy amongst city governments which, in turn, are assigning larger budgets to DRM. Nowadays, cities are successfully implementing prevention, mitigation, preparation, response, restoration and reconstruction measures. Furthermore, city governments are also working more closely with urban communities and representatives of civil society. One key example from Peru is the Disaster Risk Management Strategy for Metropolitan Lima that has involved a long process of discussion and advocacy efforts with the participation of a broad group of stakeholders, including local NGOs and civil society. The Mayor and other municipal officials made great efforts to inform and engage the public in the process through visible public interventions and through the media. To learn more, see the [ELLA Case Study: Pushing Through Reform: Lima's Disaster Risk Management Strategy](#).

²² Hardoy and Pandiella 2009, above n6.

CONTEXTUAL FACTORS

ENABLING LATIN AMERICA'S SUCCESSFUL RESPONSE



Among the factors that have contributed to urban risk management processes in Latin America, it is important to recognise the significant role of the United Nations General Assembly Declaration for the [International Decade for Natural Disaster Reduction](#) (1990-1999) in fostering political will and commitment to action. Similarly, Latin American government commitment to the Hyogo Framework for Action and, more recently, the United Nations Making Cities Resilient campaign has also helped drive forward DRM actions across the region, as well as increase awareness amongst urban populations. Other important factors include the context of regulatory changes and the decentralised governance structures in many Latin American countries that provide more autonomy to city governments.

Democratisation and decentralisation processes in the region have led to direct elections of city mayors and governments and have created specific mechanisms for citizen participation in and oversight of government activities.²³ Noteworthy mechanisms include referendums to revoke municipal mandates, participatory budgeting and neighbourhood committees. In addition, local authorities have improved their financial management practices. All of this has had positive impacts on the allocation of public spending for DRM and at the same time has strengthened control and monitoring mechanisms.

The repeat occurrence of large-scale disasters in Latin America has resulted in the creation of national civil defence systems or the evolution of these into national DRM systems. These changes have arisen thanks in part to the role of the media and public pressure. Examples include the 2009 earthquake in Chile which led to calls on the government to improve strategies for land planning, the strengthening of the [CEDEPRENAC](#) (the Coordinating Centre for the Prevention of Natural Disasters in Central America) after [Hurricane Mitch](#), and the [Armero](#) volcanic eruption emergency in Colombia, which gave birth to a new phase of institutionalisation of DRM within the country. Large-scale disasters have drawn attention to the importance and urgency of compiling detailed knowledge of risks and vulnerabilities faced by urban populations, of national systems to coordinated prevention and emergency response actions, for tailored financial

instruments and for the mainstreaming of DRM across local and national development and land planning.

The existence of strong regional and sub-regional institutions in Latin America has also played a key role in promoting and contributing to a more integral DRM approach via large-scale regional projects, knowledge exchange and development of tools and methodologies.²⁴ In the Andean region, for example, the [Andean Community](#) (*Comunidad Andina* - CAN) has just completed the EU-funded 5-year disaster risk management project [PREDECAN](#), implemented in Bolivia, Colombia, Ecuador and Peru. Since 2007, the [Red Interamericana de Mitigación de Desastres](#) (Inter-American Disaster Mitigation Network - RIMD) has been promoting DRM policy development across the region via its members that include the Caribbean Disaster Emergency Management Agency ([CDEMA-CARICOM](#)), CEPREDENAC, CAPRADE and the Specialised Meeting on Socio-natural Disaster Risk Reduction, Defence, Civil Protection and Humanitarian Aid (*Reunión Especializada de Reducción de Riesgo de Desastres Socionaturales, la Defensa, la Protección Civil y la Asistencia Humanitaria* - [REHU](#)).

Across the region, an increasing number of researchers, experts and technicians are specialising in issues relating to DRM. This has been possible due to a greater number of organisations - from national to local levels - focusing their efforts on DRM. Likewise, more funding has been made available for DRM from international development agencies and national governments and also the development of dynamic information networks and knowledge platforms for the strengthening of capabilities. Examples include: [BiVa-PAD](#), a regional network of virtual libraries providing access to information on disaster prevention and response; the web-based platform [Desaprender](#), an interactive portal and forum for learning about disaster risk used by professionals region-wide; and the Regional Disaster Information Centre for Latin America and the Caribbean ([CRID](#)), an online document library providing access to and disseminating information on disasters in Latin America and the Caribbean.

²³ To learn more about these citizen participation and oversight mechanisms, see the [ELLA Guide: Citizen Participation in Latin America: Innovations to Strengthen Governance](#).

²⁴ For more information about these regional institutions, see: Ferris, E., Petz, D. 2013. *In the Neighborhood: The Growing Role of Regional Organizations in Disaster Risk Management*. Brookings, LSE Project on Internal Displacement, Washington, DC.

- 1 The DRM approach asserts that risk is most tangible and concrete at the local level. In Latin America, this has led to a greater autonomy amongst city governments and increasing influence of organisations representing the most vulnerable populations. City authorities have an important impact on the configuration and level of urban risk. The relationship between poverty and risk is conditioned by the capacity of urban and local governments to plan and regulate urban development, provide access to safe land, provide hazard mitigating infrastructure and protection mechanisms for poor households.
- 2 By incorporating DRM into urban planning and implementing strategies to address the causal factors of risk, Latin American governments have promoted equitable urbanisation processes that reduce vulnerability and contribute to sustainable development goals. At a minimum, cities can identify risk-prone areas and through urban planning discourage new construction in these areas.
- 3 Resettlement strategies should form part of disaster management policy and include low-cost housing options, land planning, risk assessment, and control of human settlements in these zones and the control of recuperated lands to ensure that the strategy is efficient. Preventative resettlement programmes represent an opportunity to build risk resilience while improving the quality of life of the poorest and most vulnerable urban populations.
- 4 Experiences from Latin American cities highlight critical success factors for resettlement that provide useful indicators to policy makers and practitioners in other regions of the world. These factors include: integrating DRR into existing land planning processes and tools; firm decision-making; development of adequate regulations; and provision of affordable housing options. Resettlement programmes are probably the most complex examples of urban risk management in Latin America given that they include components of land planning, information, training and regulation.
- 5 The DRM approach enables us to understand disasters as products of a particular model of development. While DRM is being implemented widely in the region, in some sectors response measures are focused exclusively on improvements to infrastructure and engineering at the expense of more holistic understandings of risk. The transformation of a problem typically considered technical and scientific into a social and political issue is still underway and presents one of the greatest challenges for research, public policy and social action in the region.

CONCLUSION

Latin American cities are taking on increasing leadership in DRM strategies and are prioritising the poorest and most vulnerable populations. These strategies include concrete actions and good practice that are helping to building resilience and mainstream the DRM approach across urban policy, planning and management. South Asian and African cities can use some of the lessons being generated in Latin America by adapting them to address specific local priorities as part of holistic urban programmes for reducing urban disaster risk.

KNOWLEDGE PARTNERS

Some of the key organisations working on urban risk management strategies across Latin America are listed below. Further details about these and other organisations can be found in the [ELLA Spotlight on Organisations: Disaster Risk Management in Latin American Cities](#).

Established in 1988 in Guatemala, the [Coordinating Centre for the Prevention of Natural Disasters in Central America \(CEPRENAC\)](#) is the specialised institution of the [Central American Integration System \(SICA\)](#) for natural disaster prevention, mitigation and response. CEPREDENAC runs a [regional information and communication platform](#) for integrated disaster management.



[Desaprender](#) is a virtual platform created to promote experience-based learning exchange on disaster risk reduction. It was created for use by practitioners at the local-level, such as community members, volunteers, government officials and NGOs.

The [Earthquake Megacities Initiative \(EMI\)](#) is an international scientific initiative with the mission to advance urban risk reduction policy, knowledge and practice in megacities worldwide. In Latin America, EMI works in Bogota, Lima, Mexico City and Quito to support efforts to mainstream DRM, with an emphasis on land use planning and urban redevelopment, local-level disaster risk management and disaster resilience of basic services.

Since the 1990s, the [Economic Commission for Latin America \(ECLAC\), Division for Sustainable Development and Human Settlements, Economic and Social Disaster Assessment Unit](#) has been developing methodologies to estimate [the socio-economic and environmental effects of disasters](#) before they occur and to evaluate socio-economic impacts post-disaster. The Unit's methodologies are being put to use across the region.

The [Inter-American Development Bank \(IDB\)](#) runs two programmes to support member countries to plan and implement urban risk management strategies. Its [Cities Programme](#) helps to build sustainable cities through urban planning and regulation, and housing and neighbourhood upgrading that improves infrastructure and urban services. The [Disaster Programme](#) assists countries in designing and implementing integrated DRM plans, involving four principal lines of action: risk identification; prevention and mitigation; financial risk management; and institutional strengthening for preparedness, response and recovery.

The [Southwestern Seismological Observatory \(OSSO\)](#) is a Colombian NGO that currently operates the Southwestern Regional Seismological Network and the [National System for Tsunami Detection and Alert \(SNDAT\)](#) in Colombia. OSSO has also developed methodologies and databases used to evaluate risks associated with natural phenomena such as seismic and volcanic activity, tsunamis and landslides, as well as with climate change.

Operating out of Panama, the [United Nations International Strategy for Disaster Reduction, Regional office for the Americas](#) (UNISDR) is mandated to provide support to actors throughout North America, Latin America and the Caribbean in fostering a culture of disaster prevention and contributing

to build disaster resilient nations and communities.

Supported by the UNISDR and the World Bank, the [Urban Risk Thematic Platform for Disaster Risk Reduction in Latin America and the Caribbean](#) supports and builds networks of local governments from throughout Latin America and the Caribbean interested in strengthening the integration of DRM within their cities' development processes. Through the analysis of common problems and exchange of experiences, the Urban Risk Platform brings together city officials and authorities looking to strengthen their own risk management processes through joint initiatives (such as the [UNISDR Making Cities Resilient campaign](#)) for cooperation among cities as well as with other strategic actors.

RECOMMENDED READING

Below is a short list of recommended reading on disaster management in urban environments, with a particular focus on Latin America. Additional information about these and other publications can be found in the [ELLA Spotlight on Publications: Disaster Risk Management in Latin American Cities](#).

Correa, E. (Ed.). 2011. [Preventive Resettlement of Populations at Risk of Disaster: Experiences from Latin America](#). GFDRR, World Bank, Washington, DC.

ECLAC. 2003. [Handbook for Estimating the Socio-economic and Environmental Effects of Disasters](#). ECLAC, Santiago de Chile.

ECLAC. 2007. [Information on Disaster Risk Management: Case Studies of Five Countries](#). ECLAC, Santiago de Chile.

Government of Mexico, World Bank. 2012. [Improving the Assessment of Disaster Risks to Strengthen Financial Resilience](#). World Bank, Washington, DC.

Hardoy, J., Pandiella, G. 2009. [Urban Poverty and Vulnerability to Climate Change in Latin America](#). *Environment and Urbanization* 21 203-224.

Inter-American Development Bank (IDB). 2012. [Slum Upgrading: Lessons Learned from Brazil](#). IDB, Washington, DC.

Lavell, A. 2002. [Local Level Risk Management. Concepts and Experience in Central America](#). Paper presented at the Disaster Preparedness and Mitigation Summit, 21-23 November 2002, New Delhi, India.



O'Donnell, I. 2010. [Addressing the Grand Challenges of Disaster Risk: A Systems Approach to Disaster Risk Management](#). UNISDR, Geneva.

Pelling, M., Holloway, A. 2005. [Legislation for Mainstreaming Disaster Risk Reduction](#). Tearfund, Teddington.

UNHABITAT, ISDR, UNFPA, 2012. [Linkages Between Population Dynamics, Urbanization Processes and Disaster Risks: A Regional Vision of Latin America](#). UNFPA, New York.

[Pushing Through Reform: Lima's Disaster Risk Management Strategy](#)

In 2012, the City of Lima successfully launched an integrated DRM strategy, creating a budget of US\$ 200 million for specific DRM actions benefiting 3.5 million of its most vulnerable inhabitants.

LEARN MORE FROM THE ELLA BRIEFS

These four ELLA Briefs focus in on key aspects of the Latin American DRM approach in urban environments:

[Latin American Experience in Combining Disaster Risk Management with Poverty Reduction](#)

Latin American countries are implementing a range of innovative strategies to address the underlying causes of disaster risk, while at the same time promoting social inclusion and productive growth.

[Institutionalising Disaster Risk Management: Latin America's Systems Approach](#)

How are Latin American countries mainstreaming decentralised, democratic and participatory strategies to DRM across public policy? Through a systems approach, the region is making important advances.

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