



# Board of Executive Directors

For consideration

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**From:** The Secretary  
**Subject:** Disaster risk management policy. Revised version

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**Inter-American Development Bank**

**DISASTER RISK MANAGEMENT POLICY**

**February 22, 2007**

# DISASTER RISK MANAGEMENT POLICY <sup>1</sup>

February 22, 2007

## I) Introduction

This Disaster Risk Management Policy has been developed in the context of an increase in the number and seriousness of disasters in Latin America and the Caribbean, and the awareness that disasters have significant bearing on the economic and social development of most countries in the region, affecting disproportionately the poorest countries and people.

This policy, which emphasizes risk reduction, is intended to improve the institutional and policy framework of the Bank to support disaster risk management in order to help protect the socioeconomic development of borrowing member countries and improve the effectiveness of the Bank's assistance.

A proactive stance to reduce the toll of disasters in the region requires a comprehensive approach with an emphasis on actions taken before a hazard results in a disaster rather than on post disaster recovery. This approach seeks to make disaster risk prevention an integral part of governance. It involves the following set of activities: risk analysis to identify the types and magnitude of potential impacts faced by member countries and that affect development investments; prevention and mitigation measures to address the structural and nonstructural sources of vulnerability; financial protection and risk transfer to spread financial risks over time and among different actors; emergency preparedness and response to enhance a country's readiness to cope quickly and effectively with an emergency; and post-disaster rehabilitation and reconstruction to support effective recovery, and to safeguard against future disasters.

The Bank recognizes that adequate institutional capacities and a meaningful participation of civil society are particularly important to manage risks related to natural hazards at the regional, national and local levels and for the successful achievement of this policy's objectives. The Bank will make an additional effort to take into account: the incentive structures and competing priorities influencing investment decisions for disaster risk management by national, regional or local governments; the increased role of private sector investment and public/private sector partnerships; improvements in the quality of and access to information through research and new technologies; the growing importance of regional and global challenges and opportunities, and the need for inter-agency coordination for effective action. The Bank acknowledges that development processes such as rapid urbanization and environmental degradation may influence vulnerability to natural hazards and that vulnerability is often gender and poverty specific.

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<sup>1</sup> The companion paper to the proposed new policy provides background support and context for this document. It underscores the current state of disaster risk management in Latin American and the Caribbean and the need for reducing vulnerability. It also details the merits of the shift to disaster risk management that is embodied in the new policy.

## II) Objectives

The purpose of the Bank's disaster risk management policy is to guide the Bank's efforts to assist its borrowers in reducing risks emanating from natural hazards and in managing disasters, in order to support the attainment of their social and economic development goals.

The policy has two interrelated specific objectives:

- i) To strengthen the Bank's effectiveness in supporting its borrowers to systematically manage risks related to natural hazards by identifying these risks, reducing vulnerability and by preventing and mitigating related disasters before they occur; and
- ii) To facilitate rapid and appropriate assistance by the Bank to its borrowing member countries in response to disasters in an effort to efficiently revitalize their development efforts and avoid rebuilding vulnerability.

## III) Scope

### Areas of Coverage

The Disaster Risk Management Policy applies to the Inter-American Development Bank (IDB), in both its public and private sector activities, and to the Multilateral Investment Fund (MIF).

Activities and instruments subject to this policy include the development and implementation of country strategies and country program dialogues, financial and nonfinancial products, public and private sector operations, financial intermediation, and relevant aspects of the Bank's project procurement practices.

This policy provides two lines of action addressing: (i) the prevention and mitigation of disasters that occur as a result of natural hazards, through programming and proactive project work at regional, national and local levels; and (ii) post disaster response to the impacts of natural hazard events, and physical damage (such as structural collapse and explosions) resulting from technological accidents or other types of disasters resulting from human activity.

With respect to natural hazards, this policy covers the range of events from *low frequency/high consequence hazards* to *high frequency/low consequence hazards*. High consequence hazards typically result in a "declared" disaster that exceeds the coping ability of the affected country or community using its own resources. When high frequency/low consequence hazards (such as frequent floods, forest fires or droughts) are poorly managed they can have significant cumulative impacts on a country's efforts to reduce poverty and attain social equity objectives, as well as on its economic development.

The Bank does not have a comparative advantage in the area of humanitarian assistance. Such assistance should only be addressed through emergency technical cooperations (as described in Directive B-3) or through non-IDB sources.

### **Key Definitions**

“*Disaster*,” as used in this policy, refers to a serious disruption of the functioning of a society, community or project causing widespread or serious human, material, economic or environmental losses, which exceed the coping ability of the affected society, community or project using its own resources.

“*Natural hazard*” refers to natural processes or phenomena affecting the biosphere that may constitute a damaging event. Such hazards include: earthquakes, windstorms, hurricanes, landslides, tidal waves, volcanic eruptions, floods, frosts, forest fires and drought, or a combination thereof. Hazards emanating from climatic variations such as those linked to the El Niño phenomenon are covered by this policy.

“*Vulnerability*” is a condition determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

“*Disaster risk management*” is the systematic process that integrates risk identification, mitigation and transfer, as well as disaster preparedness to reduce the impacts of future disasters. It incorporates emergency response, rehabilitation and reconstruction to lessen the impacts of current disasters while avoiding to rebuild vulnerability.

### **Areas Outside the Present Policy**

The prevention and mitigation of disasters caused by social and political violence (also referred to as conflict-driven disasters) will be treated separately from this policy since the planning and application of policies, strategies and measures that identify and reduce risks associated with these events are very different than those necessary to prevent and mitigate natural hazards.

The prevention of technological hazards will be managed as part of the Bank’s regular project design and implementation process in accordance with applicable sector policies. Bank activities to address and revert environmental degradation, which may be an underlying reason for increased vulnerability to natural hazards and in some case increased hazards, will be managed through the Bank’s Environment and Safeguards Compliance Policy, which also provides safeguards to ensure that all Bank operations and activities are environmentally sustainable.

Epidemics and pandemics such as HIV/AIDS are outside the policy scope. These are covered by the Bank’s Public Health Policy.

Lending operations to address financial emergencies are treated through the Bank’s Emergency Lending Guidelines.

Risk management related to the Bank's personnel and installations is covered in the Bank's Business Continuity Plan.

#### **IV) Directives**

The following directives provide the principles that the Bank will follow to manage disaster risk related to programming and project work in both the public and private sectors, and the Bank's response to a disaster.

##### ***IV-A) Risk Management through Programming and Operations***

###### **A-1. Programming**

Dialogue with borrowing member countries. The Bank will seek to include the discussion on proactive disaster risk management in the dialogue agenda with borrowing member countries. The Bank will give due consideration to vulnerability associated with natural hazards and risk management in relation to the priority areas of intervention discussed and agreed with the borrowers for the development of country and regional strategies, and operational programs.

The Bank will identify countries according to their level of exposure to natural hazards based on existing indicators and Bank experience. For countries that are highly exposed to natural hazards the Bank will identify their potential vulnerability as a major development challenge and propose a country level disaster risk assessment. When the assessments identify that potentially important disruptions in the country's social and economic development could be caused by disasters resulting from natural hazards, the Bank will encourage the inclusion of disaster risk management activities in the country strategy and operational program agreed with the borrower. These may include policy reforms, and specific institutional strengthening and land use planning activities, measures of financial protection such as through risk transfer, and investment projects conducive to reducing vulnerability at the national, regional and municipal levels. Where the natural hazards may affect more than one country, the Bank will encourage regional approach within the existing programming framework. The Bank will promote the use of the Disaster Prevention Sector Facility and the Disaster Prevention Fund described in Section V of this policy and other means it offers to finance the recommended actions resulting from the assessment process.

###### **A-2 Risk and Project Viability**

Identification and reduction of project risk. Bank-financed public and private sector projects will include the necessary measures to reduce disaster risk to acceptable levels as determined by the Bank on the basis of generally accepted standards and practices. The Bank will not finance projects that, according to its analysis, would increase the threat of loss of human life, significant human injuries, severe economic disruption or significant property damage related to natural hazards.

During the project preparation process project teams will identify if the projects have high exposure to natural hazards or show high potential to exacerbate risk. The findings will be reported to the Bank through the social and environmental project screening and

classification process. Project teams should consider the risk of exposure to natural hazards by taking into account the projected distribution in frequency, duration and intensity of hazard events in the geographic area affecting the project.

Project teams will carry out a natural hazard risk assessment for projects that are found to be highly exposed to natural hazards or to have a high potential to exacerbate risk. Special care should be taken to assess risk for projects that are located in areas that are highly prone to disasters as well as sectors such as housing, energy, water and sanitation, infrastructure, industrial and agricultural development, and critical health and education installations, as applicable. In the analysis of risk and project viability, consideration should be given to both structural and non-structural mitigation measures. This includes specific attention to the capacity of the relevant national institutions to enforce proper design and construction standards and of the financial provisions for proper maintenance of physical assets commensurate with the foreseen risk.

When significant risks due to natural hazard are identified at any time throughout the project preparation process, appropriate measures should be taken to establish the viability of the project, including the protection of populations and investments affected by Bank financed activities. Alternative prevention and mitigation measures that decrease vulnerability must be analyzed and included in project design and implementation as applicable. These measures should include safety and contingency planning to protect human health and economic assets. Expert opinion and adherence to international standards should be sought, where reasonably necessary. In the case of physical assets, the Bank will require that, at the time of project preparation, the borrower establish protocols to carry out periodic safety evaluations (during construction as well as during the operating life of the project) and appropriate maintenance of the project equipment and works, in accordance with generally accepted industry norms under the circumstances.

The Bank's social and environmental project screening and classification process will evaluate the steps taken by project teams to identify and reduce natural hazard risk.

#### ***IV-B) Post Disaster Operations***

In order to provide timely assistance at different stages after a disaster, the Bank may employ special procedures for processing and reformulating loans to streamline preparation and expedite execution, including the Bank's Special Procurement Procedures for Emergency Situations.

##### **B-1. Loan Reformulation**

Redirecting resources from existing loans. The Bank may approve the reformulation of existing loans in execution in response to disasters if: (i) a state of emergency or disaster has been officially declared by the government; (ii) the impact of the loan reformulation has been estimated taking into account the intended uses and project objectives of the loan or loans to be reformulated relative to the new proposed use of the funds, thereby creating the conditions for more informed decisions on the part of the approving authorities; (iii) adequate transparency and sufficient mechanisms for monitoring, auditing and reporting the use of the redirected funds is in place, while taking into account the need of a timely re-

sponse given the nature of the situation; and (iv) a significant share of the redirected funds will be earmarked to reduce the borrower's vulnerability to future disasters and improve the country's capacity for comprehensive disaster risk management.<sup>2</sup>

### **B-2. Reconstruction**

Avoiding rebuilding vulnerability. Operations that finance rehabilitation and reconstruction after a disaster require special precautions to avoid rebuilding or increasing vulnerability. These include the precautions mentioned in A-2, as well as correcting deficiencies in risk management policies and institutional capacity as reflected in A-1. A significant share of the new investment will be earmarked to reduce vulnerability to future disasters and improve the country's capacity for comprehensive disaster risk management.<sup>3</sup> Particular attention must be given to lessons learned from recent hazard events. The Bank will not assume that pre-disaster conditions persist in whole or in part in the affected area. Disaster risk assessment of the reconstruction project should be carried out taking into account the specifics of the area, the sector and the infrastructure concerned, as well as the current environmental, social and economic situation and any changes in the affected area as a result of the disaster.

### **B-3. Humanitarian Assistance**

Limited Bank role. Humanitarian assistance with Bank funding may be granted only if a state of emergency or disaster has been officially declared by the government. This funding will be provided only through emergency technical cooperations, to be implemented during or immediately after a disaster. The resources should be administered by international or local aid organizations specialized in humanitarian assistance. The Bank's representative, in coordination with the government of the beneficiary country, is responsible for identifying the aid organizations that will receive the funding and administer the assistance.

In the event that the Bank enters into a future agreement to administer resources provided by outside sources that include humanitarian assistance among the activities eligible for financing, this assistance should be designed in a manner that is consistent with the principles set out in the present policy.

## **V) Policy Implementation**

This policy enters into effect three months after its approval by the Board of Executive Directors. This will allow sufficient time to implement administrative changes and procedures within the institution. The policy will apply to operations that enter the Bank's pipeline<sup>4</sup> after the date the policy enters into effect.

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<sup>2</sup> The guidelines for this policy will recommend the appropriate part of the total cost for investments that should be allocated to disaster prevention and mitigation measures for loan reformulation or reconstruction projects.

<sup>3</sup> Ibid.

<sup>4</sup> Entering the Bank's pipeline means (i) after the signing of the mandate letter, for private sector operations, (ii) after the project number has been issued, for public sector and Multilateral Investment Fund operations, and (iii) for country strategy papers, those that have not yet been initiated (practice among the



To support this policy, Bank management will issue specific guidelines on how to apply the policy's principles and each of its directives. The guidelines may be updated by management from time to time as necessary to reflect lessons learned and emerging good practices. The guidelines and the companion paper to this policy will include a complete list of definitions.

The Bank will use its standard procedures including those of the environmental classification and screening process for monitoring performance and evaluating compliance with the directives set out in this policy. The Bank will have an independent evaluation carried out three years after the policy enters into effect, to assess its impact on Bank activities, particularly concerning the integration of disaster risk management in the programming process as outlined in A-1 and disaster risk management in the project cycle as outlined in A-2. The Bank will publicly report its experience with the implementation of this policy and the achievement of its objectives.

The Bank has several specialized instruments at its disposal that contribute to the implementation of this policy. These instruments may be used to assist its borrowing member countries in managing disaster risk, in addition to the Bank's regular lending and technical cooperation mechanisms. They include, inter alia, the Disaster Prevention Sector Facility, the Disaster Prevention Fund and the Multidonor Disaster Prevention Trust Fund, that provide financing for the identification, prevention or mitigation of risk, and preparation for disasters. Instruments for post disaster operations include the Immediate Response Facility([link](#)), the Emergency Technical Cooperation([link](#)), and the Special Procurement Procedures for Emergency Situations([link](#)). The Bank will review existing instruments and may establish new mechanisms to increase its efficiency and effectiveness.

The policy cannot specifically encompass all circumstances, and consequently, it is conceivable that departures from one or more of the directives in the policy may need to be considered. In such circumstances, proposals advocating a departure in either programming activities or in project development and execution must demonstrate the exceptional characteristics of the situation that justify the departure. Project proposals with deviations from the policy should include the measures to mitigate the associated effects and formally request any specific exceptions to the policy.

## **VI) Relation to Other Policies**

This policy will supersede OP-704 on *Natural and Unexpected Disasters*. This policy will be implemented in a manner that is consistent with all relevant Bank policies and strategies.

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operational departments currently states that the country strategy process is considered initiated once an Annotated Outline, Issues Paper or Policy Dialogue Paper has been created).

# From Disaster Response to Prevention

## Companion Paper to the Disaster Risk Management Policy

**Inter-American Development Bank**

Washington, D.C.

**Sustainable Development Department  
Sector Strategy and Policy Papers Series**

The principal authors of this document are Kari Keipi, Sr. Natural Resource Specialist of the IDB, Niels Holm-Nielsen, currently working for the World Bank, and Stuart Miller, at present time employed by Air-international, a consulting firm. The review team included the disaster focal points at the IDB, especially Caroline Clarke, Javier Cuervo, Pedro Martel and Sergio Mora-Castro. Contributions were received also through the extensive in situ consultation process on the disaster Risk Management Policy. Electronic consultation was carried out among more than 5,000 persons to whom the draft policy document and the draft of this document were sent with the help of the International Strategy of Disaster Reduction (ISDR) of the United Nations.

This report provided information necessary to formulate the Bank's new Disaster Risk Management Policy, which was favorably reviewed by the Board of Directors of the IDB on February 28, 2007.

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# Foreword

Latin America and the Caribbean are experiencing two trends that should make disaster risk management an important concern for development planners and governments in the region. First, the number and severity of natural hazard are rising. Second, the vulnerability to these hazards is increasing, mainly due to unplanned urbanization, demographic growth in risky areas and insufficient environmental management. Consequently disaster losses have risen much faster than average economic growth over the last two decades. Some countries have paid attention to this situation and are already planning actions in order not to place their development options at risk. Many others have yet to take note of it. Disaster risk must be managed proactively to reduce vulnerability and prepare for reconstruction, as well as to bridge the gap between losses and available funds for post-disaster reconstruction.

Currently, disaster risk management in the region relies largely on an ex post strategy that is based on the expectation of external assistance. There are some exceptions, but for the most part prevention to reduce risk and preparation for potential disaster losses have been inefficient.

Until recently, IDB activities have also consisted chiefly of financing after a disaster. While ex ante mechanisms exist and, in some cases, have been used quite effectively, on the whole disaster risk management has been incorporated only partially into the Bank's dialogue with its borrowing member countries and the programming cycle. As a result, opportunities to reduce risk and to protect the effectiveness of the Bank's development financing have been lost.

The aim of the Policy on Disaster Risk Management favorably reviewed by the Board of Execution Directors of the IDB on February 28, 2007 is to provide clear directives for the Bank to ensure that its assistance supports proactive disaster risk management. It represents the Bank's continued commitment to protect and help generate economic and social development in the region.

This paper provides background and context for the new policy. It underscores the need for reducing vulnerability in Latin American and the Caribbean and establishes the merits of a shift to proactive disaster risk management embodied in the policy.

Janine Ferretti  
Chief  
Environment Division



# Introduction

Disasters due to natural hazards have increasingly devastating impacts on the development prospects of most countries in Latin America and the Caribbean. During the past thirty years disasters in the region have affected roughly 4 million people a year, causing some 5,000 deaths and US\$3.2 billion in physical losses.<sup>1</sup> The economic costs of disasters are rising and, over the last two decades, have far outpaced the average rate of economic growth. Traditionally, countries have managed disasters by mobilizing resources in response to an event. This approach, however, has significant opportunity costs because it implies that resources are often diverted from other planned development objectives. Furthermore, recent economic research indicates that for many countries in the region the ability to mobilize resources internally and externally after a disaster will not be sufficient to cover the costs of recovery. Despite rising awareness and recent progress, several of the Bank's borrowing member countries face high risks to their sustained development as a result of natural hazards. Insufficient planning and the lack of mitigation measures exacerbate this risk. When vulnerability is high, these hazards may seriously jeopardize progress in reducing poverty, improving social equity and promoting sustainable economic growth.

The IDB Operational Policy on Natural and Unexpected Disasters (OP-704, approved in 1998) took an important step toward consolidating the risk management framework for Bank operations by addressing ex ante actions as well as disaster response. In 2000, the Bank developed an action plan (entitled "Facing the Challenges of Natural Disasters in Latin America and the Caribbean") that sharpened its conceptual framework in this

area. In 2001, the Bank introduced a new loan instrument (the Disaster Prevention Sector Facility). However, in 2004, an evaluation of OP-704 showed that it did not go far enough, and that Bank operations continued to be predominantly focused on responding to emergencies. Most recently, the Bank created a Disaster Prevention Fund and the Multidonor Disaster Prevention Trust Fund that can provide grant financing for the design of disaster prevention investments, disaster risk assessments and institution building for disaster risk management.

The operational policy of 2007 will enable the Bank to support proactive disaster risk management. A proactive stance to reduce the toll of disasters in the region requires a comprehensive approach with an emphasis on actions taken before hazards result in disasters, rather than on post disaster recovery. The policy of 2007 will emphasize prevention through structural and nonstructural measures. This paper is aimed at providing context and justification for the underlying strategic vision of the new disaster risk management policy.

The paper is organized in five parts. Part II introduces disaster risk management from a development perspective that makes reducing vulnerability the central issue in the Bank's proposed shift to a more proactive disaster risk management policy. Part III discusses current disaster management risk practices and future action requirements. Part IV examines Bank actions in accordance with the policy of 2007. Part V outlines further opportunities for action as part of the implementation of the policy of 2007.

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<sup>1</sup> Inter-American Development Bank. 2004. Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters. Office of Evaluation and Oversight. Document RE-292. Washington, D.C: Inter-American Development Bank.



# Disaster Risk Management in a Development Perspective

Natural hazards present a challenge for attaining the social and economic development goals of the countries of Latin America and the Caribbean. A survey of Latin American policymakers commissioned as part of an evaluation of the IDB's current operational policy on natural and unexpected disasters, found that post-disaster borrowing to pay for the emergency response is perceived to result in a decline in the availability of resources for other development priorities.<sup>2</sup> Thirty-four percent of respondents said that they believed that emergency-related borrowing had a negative impact on efforts to reduce poverty. Forty percent said resources were not available for public health, education, and social goals because of post-disaster borrowing. Forty-three percent said that they believed that post-disaster borrowing had a serious and negative impact on the economy, including slower economic growth, higher inflation and dampened investment. Research supports these perceptions: financial obligations to cover losses may create a serious drag on development, diverting resources from pro-poor investments and thereby indirectly contributing to increasing their vulnerability to future events.<sup>3</sup>

Disasters occur when vulnerable societies or communities are exposed to hazardous events and are unable to absorb or recover from their impact. While these events are often described as *natural* disasters, both vulnerability and some hazards are

a result of human activities. Natural hazard events destroy development gains, but development processes themselves play a role in driving disaster risk. Reducing the number of national disasters resulting from natural hazards means improving development planning to halt the trends of increasing vulnerability in the region.

## THE LEVEL OF RISK IN LATIN AMERICA AND THE CARIBBEAN

The region confronts a large variety of natural hazards. Windstorms and flooding are the most common natural hazards in the Caribbean. Floods, landslides and earthquakes are the largest hazards in South America, while Central America regularly faces the full menu of disasters including floods, windstorms, earthquakes and volcanic eruptions.

There are two factors that make disaster risk reduction urgent in Latin America and the Caribbean. The first is that disaster losses are rising. This is due to increased risk, a product of the rise both in the incidence and in the strength of hazards, and growing vulnerability of human settlements due to their concentration in risky areas. The second factor is that the gap between potential losses and the capacity of many countries to finance future reconstruction has reached alarming levels.

### Increasing Losses

Over the past three decades, nearly 4 million people in the region have been affected annually by disasters, resulting in an average of 5,000 deaths per year and direct economic losses valued at over US\$3.2 billion.<sup>4</sup>

As figure 1 shows, the frequency of disasters has increased over the last 30 years. The occurrence

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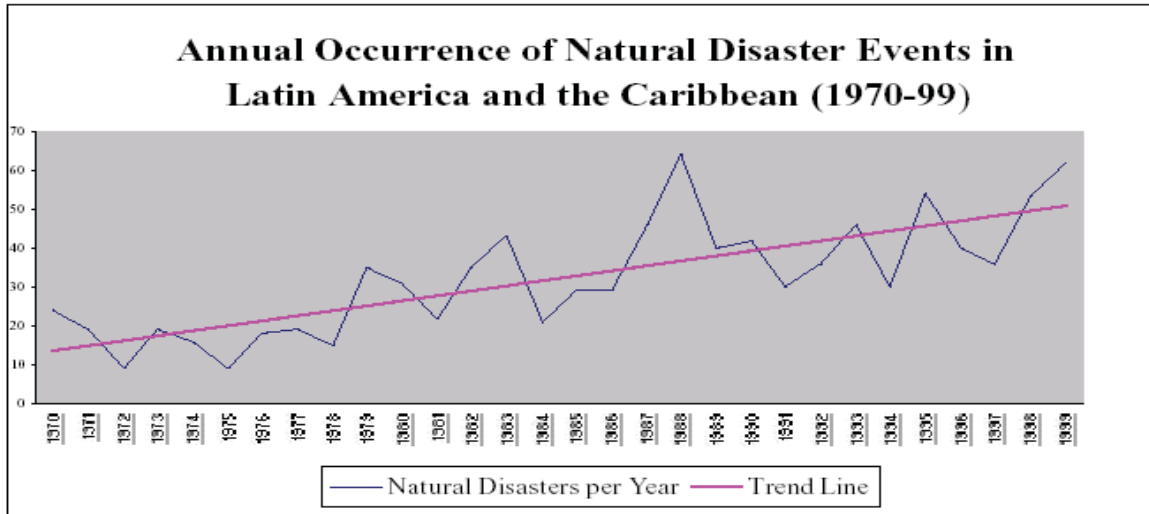
<sup>2</sup> Office of Evaluation and Oversight. Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters. Document RE-292. Washington, D.C.: Inter-American Development Bank. A survey of Latin American policymakers was commissioned as part of the study and carried out by Swiss Federal Institute for Snow and Avalanche Research SLF, 2004.

<sup>3</sup> See for instance: Chavériat, C. 2000. *Natural Disasters in Latin America and the Caribbean: An Overview of Risk*. Working Paper No. 434. Washington, D.C.: Inter-American Development Bank; ECLAC. 2003. *Handbook for Estimating Socio-Economic and Environmental Effects of Disasters*. United Nations Economic Commission for Latin America and the Caribbean, Mexico City, Mexico.

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<sup>4</sup> Inter-American Development Bank. 2004. Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters. Office of Evaluation and Oversight. Document RE-292. Washington, D.C.: Inter-American Development Bank.

**Figure 1: Historic Disaster Trends in Latin America and the Caribbean**



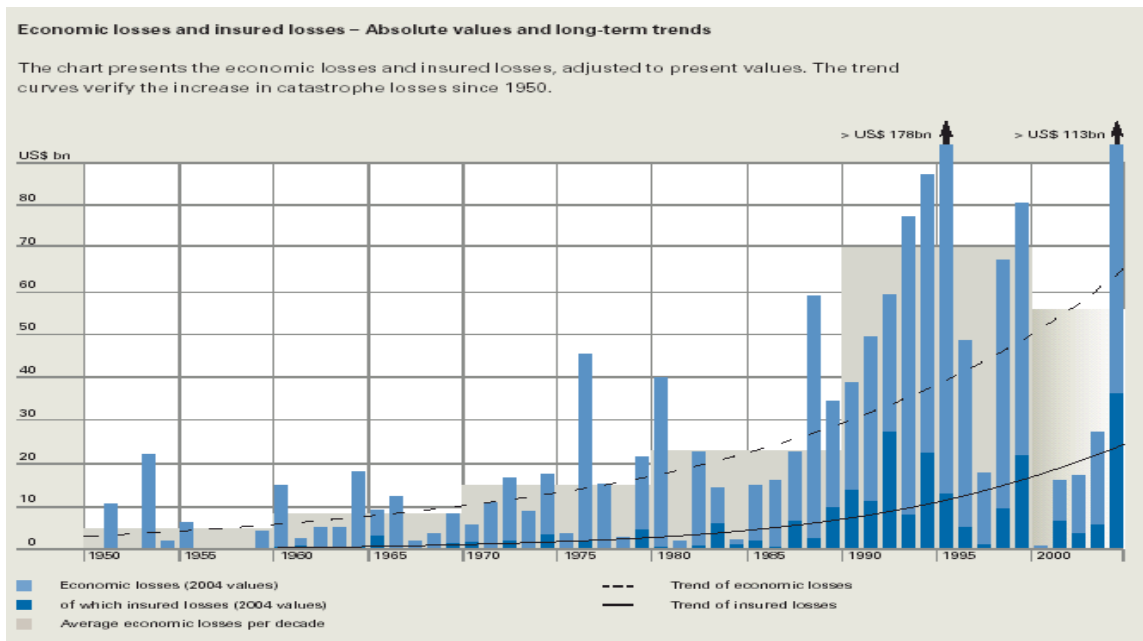
Source: Charvériat, Céline. 2000. Natural Disasters In Latin America and the Caribbean: An Overview of Risk. Working Paper No. 434. Washington, DC: Inter-American Development Bank, p. 31.

of disasters by decade tripled between the 1970s and the 1990s. The frequency rate of the occurrence of major disasters is now well over 40 per year in the region.

A rise in the occurrence of disasters is likely to indicate that losses are on the rise too. This assertion is corroborated by research done by United Nations Economic Commission for Latin America

and the Caribbean (UN/ECLAC), which has developed a methodology and evaluated losses from major disasters in the region since 1999. According to their findings, the region has incurred annual losses averaging US\$7 billion, double the US\$3.2 billion mentioned above. This estimated increase in disaster losses in the region is also corroborated by evidence that disaster losses globally are on the rise (see global trends in figure 2).

**Figure 2: Historic Trend for Global Economic Disaster Losses**



Source: Munich Re. 2005. "Topics Geo. Annual Review: Natural Catastrophes 2004." Munich, Germany, p. 15.

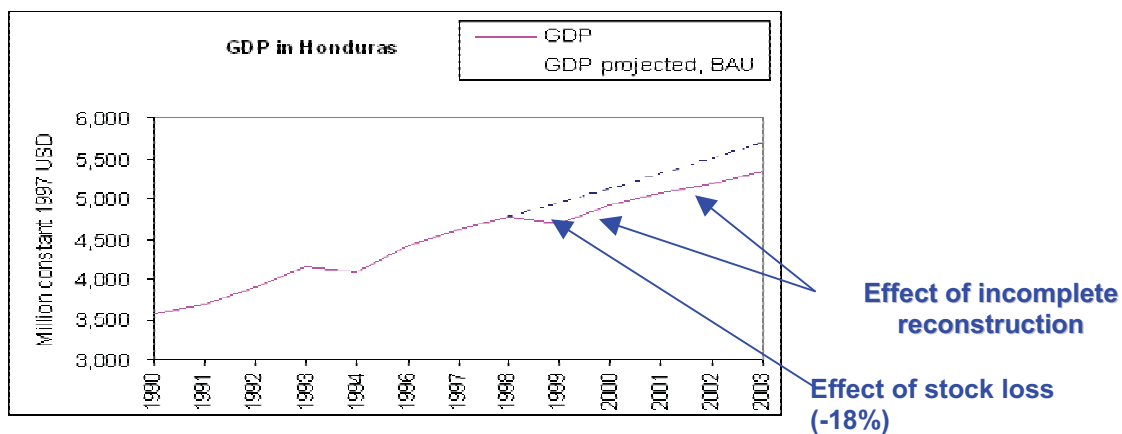
The IDB and other agencies are financing research to improve the understanding of the impact that natural disasters have on national economies. Though the relation is not yet fully documented, an increasing amount of evidence suggests that disasters have a negative impact on GDP growth even for relatively large economies. Figures compiled by the World Bank show that in the period 1990 to 2000, natural catastrophes resulted in GDP losses amounting to 15.6 percent in Nicaragua, 12.6 percent in Jamaica and 1.8 percent in Argentina. Figure 3 shows how Hurricane Mitch

(1998) has affected economic growth in Honduras. Estimates place 2002 GDP 8 percent lower than would otherwise have been the case. At the same time, environmental degradation due to deforestation and other practices are increasing risks to rural populations.

*Trend: Increasing Populations and Assets at Risk*

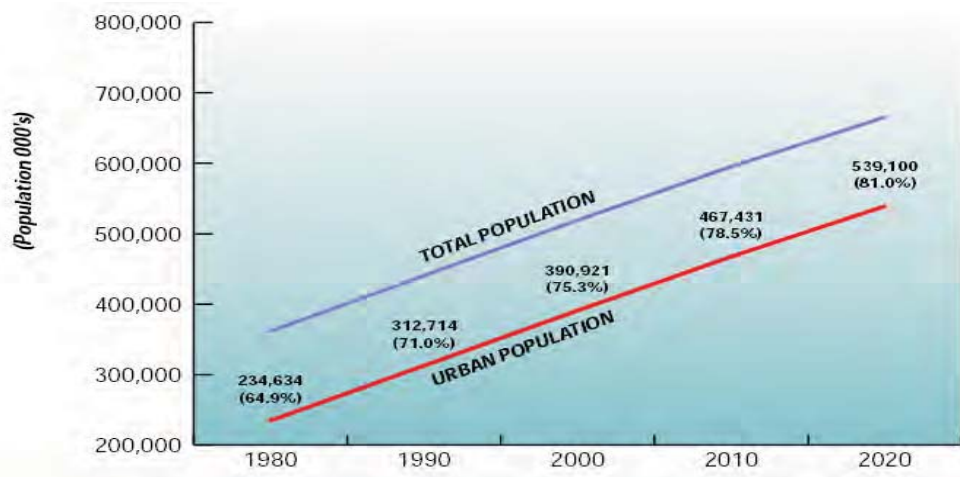
Rising population (in absolute terms) and continued urban migration (see figure 4), are outpacing development planning in much of Latin America

**Figure 3: Impact of Hurricane Mitch on Honduras GDP**



Source: Joanne Linnerooth-Bayer and Reinhard Mechler, IIASA. Presentation at the IDB, 2005.

**Figure 4: Population of Latin America and the Caribbean, 1980 - 2020**



Source: UN Habitat. The State of the Cities of the World, 2001.

and the Caribbean. The increasing concentration of population in vulnerable urban areas is putting more people and assets at risk to natural hazards. Unmanaged urban growth and human settlements are a problem since housing is often constructed without appropriate regard to building codes, zoning laws and environmental standards. This tends to result in highly vulnerable structures often built on marginal lands, hillsides or floodplains.

*Trend: Increasing Number and Severity of Hazards Resulting from Changing Climate*

Scientists expect that global warming is going to further increase the incidence and intensity of weather-related natural hazards such as hurricanes. Hurricane impacts have been directly linked to the measurable increase in ocean water temperatures in the Caribbean Sea. The temperature has now reached a level where coral bleaching is starting to occur.<sup>5</sup> The bleaching and resulting death of coral causes the destruction of protective barriers and thereby makes coastal areas more vulnerable to storm surges.<sup>6</sup> This vulnerability to storm surges is exacerbated by the gradual rise in sea level, another effect of global warming.

The changing climate may also cause weather related hazards in previously unthreatened areas. One example is from Brazil where, in March 2004, a category 1 hurricane developed off the coast of Porto Alegre in the southern part of the country. This was the first-ever registered hurricane in the South Atlantic.

Other likely impacts of climate change that may increase the vulnerability to hazards or their frequency and strength include changes in precipitation patterns. One example has to do with the

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<sup>5</sup> Coral bleaching in the Caribbean is usually triggered by an increase of at least 1.0°C in SST above the normal summertime maximums with a duration of at least 2 to 3 days. Bleaching is predicted to become an annual event in the Caribbean by 2020 (Source: Loretta Burke and Jonathan Maidens, 2004. "Reefs at Risk in the Caribbean," World Resources Institute, Washington D.C.)

<sup>6</sup> Widespread death of coral in the Caribbean will also affect the tourism and the fishing industries. Sixty-five percent of Caribbean commercial fishing depends on ecosystem services from coral reefs.

phenomena of El Niño and La Niña causing increased rainfalls and potential floods in some areas and drought in others.<sup>7</sup> There may be a link between increasing temperatures, precipitation and increases in weather-related landslide fatalities as shown in figure 5.

Another important challenge for the region is the destruction of tropical glaciers in the Andean region, which will have an impact on the supply and distribution of freshwater both for major urban centers such as Quito, La Paz and Bogotá, as well as the supply of water for agriculture and hydro-power plants. For example, the Chacaltaya glacier supplying La Paz, Bolivia, with 30 percent of its current freshwater resources is estimated to disappear by 2015.<sup>8</sup>

### **Financing Deficit for Disaster Recovery**

Research comparing possible economic losses due to disasters against a country's financial capacity has revealed that many Latin American countries are financially highly vulnerable to natural hazards. The study was based on two decades of data from 12 nations in Latin America and the Caribbean.<sup>9</sup> It highlights the budgetary implications of natural hazards and underscores the need to consider insuring public and private assets, establishing loss reserves, securing contingent credits and investing in prevention and mitigation.

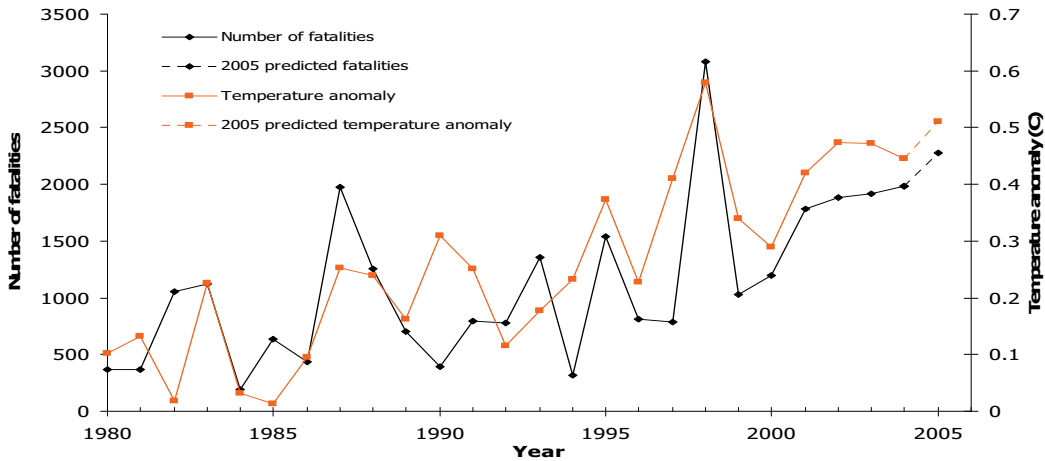
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<sup>7</sup> El Niño is a weather disruption in the tropical Pacific, during which the water temperature off the coast of South America rises sharply for a period of 12 to 18 months. The strongest effects are torrential rains and storms on the eastern side of the ocean and drought on the west, although related effects are also felt right across the globe. The strongest El Niño in over a century occurred in 1997-98. By contrast, La Niña is a weather disruption during which the water temperature off the coast of South America falls by up to 4°C.

<sup>8</sup> Source: Presentation at the IDB, March 2006 by Walter Vergara, World Bank.

<sup>9</sup> Cardona, Omar Dario. 2005. Indicators of Disaster Risk and Risk Management. Program for Latin America and the Caribbean. Inter-American Development Bank, Washington, D.C.

**Figure 5: Trends in Landslide Fatalities**

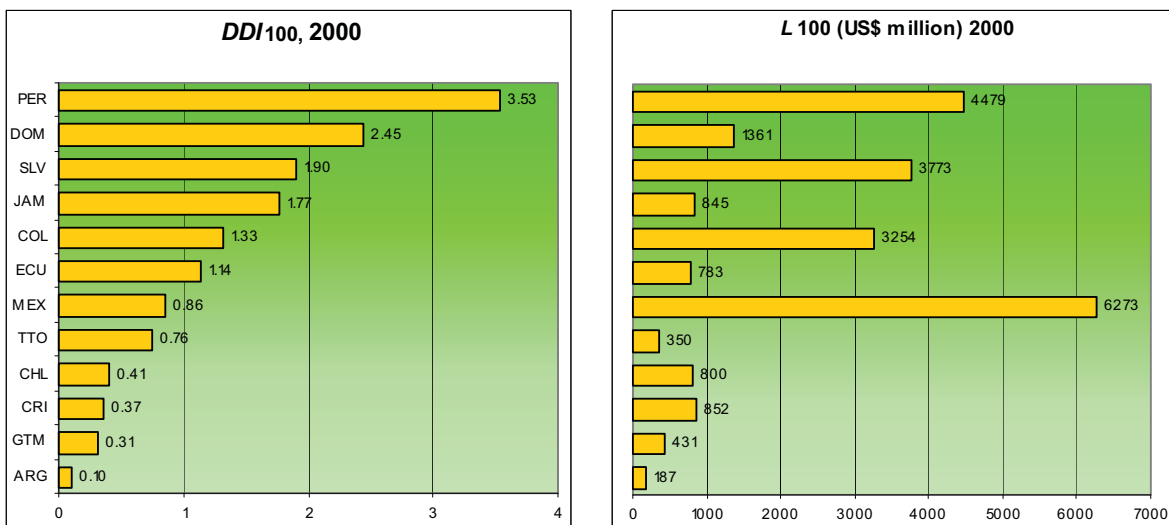


Source: David Petley, Landslide Observatory in the Joint Center for Earth Systems Technology at the University of Maryland, and Mark Bulmer, International Landslide Centre at the University of Durham in the United Kingdom, presentation at the IDB, March 2005.

Figure 6 illustrates the Disaster Deficit Index (DDI) for a 100-year event (that is, there is a 10 percent probability that the event will take place within the next 10 years). The DDI is the ratio of the available supply of financial resources to the estimated losses. The supply calculations take into

account insurance, disaster reserve funds, aid and donations, new taxes, budgetary reallocations, external credit, and internal credit. When the DDI is greater than 1.0 the country has an estimated economic inability to cope with 100-year disasters even when indebtedness is carried to a maximum.

**Figure 6. Disaster Deficit Index (DDI) and with a Loss (L). Recurrence of 100 years (10% probability of occurrence in a period of 10 years)**

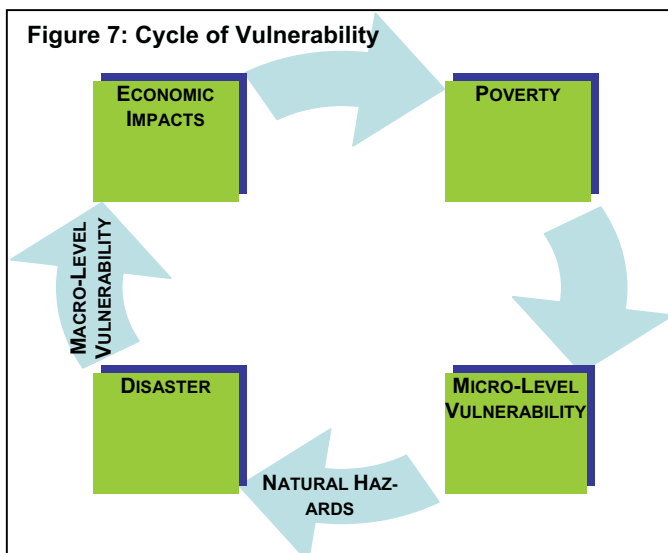


Source: Cardona 2005, p. 11.

The greater the Disaster Deficit Index, the greater the gap.

Half of the countries studied would be unable to raise the funds needed for reconstruction following a 100-year event. The left side of figure 6 shows these countries as those whose bar extends beyond the value of 1 (vertical line). As shown on the right side of figure 6, while in relative terms Peru, the Dominican Republic and

and critical infrastructure, and the extent of degradation of the natural environment. In other words, a natural hazard event is transformed into a disaster when it comes into contact with a vulnerable population. Furthermore, the impacts of a disaster can create conditions that breed still more vulnerability and thereby increase the risk that another natural event will result in a new disaster (see figure 7). This cycle of vulnerability can seriously hamper the development prospects of a country by



El Salvador face the most critical situation, estimated absolute losses (L) would be greatest for Mexico. According to the study, only one of the 12 countries (Costa Rica) would be able to finance reconstruction after a 500-year event (graphs not shown). If these and other Latin American and Caribbean countries in similar situations do not undertake significant risk reduction investments and financial protection measures against potential losses, future major hazard events may severely diminish development prospects.

### VULNERABILITY

The key link between natural hazard events, disasters and a country's economic and social development is vulnerability. Vulnerability describes the relationship between the exposure to external stresses and the capacity to respond. Common drivers of vulnerability are factors such as poverty, social inequalities, the quality of institutions

directly affecting important development goals concerning poverty reduction, communicable diseases, education, environmental sustainability and improving the situation of women (see box 1).

### DISASTERS AND POVERTY<sup>10</sup>

Poverty and unplanned developments trigger a series of conditions that contribute to the vulnerability of communities, households and individuals. Many lower income people live in substandard housing that is less able to withstand natural forces. Some live in high-density settlements near cities, built on steep slopes that are vulnerable to landslides and mudflows. Others live in low-lying areas and are at risk of flooding. In rural areas poverty drives deforestation and unsustainable

<sup>10</sup> Segments of this section are based on: Indu Abraham. 2005. Vulnerability of the Most Vulnerable. Inter-American Development Bank. Washington, D.C. Unpublished.

## **BOX 1 THE MILLENNIUM DEVELOPMENT GOALS AND DISASTER RISK MANAGEMENT**

### **1. Eradicating extreme poverty and hunger**

Recent statistical analyses prove a long-held theoretical position that human vulnerability to natural hazards and income poverty are largely co-dependent. At the national level, reducing disaster risk is often contingent upon alleviating poverty and vice versa.

### **2. Achieving universal primary education**

Educational attainment is a fundamental determinant of human vulnerability and marginalization. Broadening participation in development decision-making is a central tenet of disaster risk management. The destruction of schools is one very direct way in which disasters can inhibit educational attainment, but perhaps more important is the drain on household resources. Households frequently have to make difficult decisions on expending resources on survival and coping with poverty, or on investments (such as education and health care) to alleviate human vulnerability and enhance longer-term development prospects. If affected by a disaster, the poorest have little choice and devote their resources to survival; sending children to school falls lower in their list of priorities.

### **3. Promoting gender equality and empowering women**

Facilitating the participation of women and girls in the development process, including efforts to reduce disaster risk, is a key priority. Women across the world play critical roles in shaping development risks. In some contexts, women may be more exposed and vulnerable to hazards. For example, those with responsibilities in the household may be more exposed to risk due to unsafe buildings. At the same time, women are often more likely than men to participate in communal actions to reduce risk and enhance development. Targeting disaster risk policy so that it builds on the social capital represented by women can lead to more informed policies. Such a model will not be easy to implement, but best practices exist to point the way. Barriers to women's participation at higher levels of decision-making severely limit the skills and knowledge available for reducing risk. Overcoming disparities in access to education is a fundamental component of the disaster risk management agenda.

### **4. Reducing child mortality**

Children under five years of age are particularly vulnerable to the impacts of hazards such as floods and drought (drowning and starvation) as well as to environmental risks (inadequate sanitation and lack of drinking water), which foster communicable diseases. In addition, the health infrastructure is often damaged and made inoperable in a catastrophic event. The loss of caregivers and household income-earners plus the stress of displacement can take especially heavy tolls on the psychological and physical health of children under five years of age. Policies to support sustainable development by reducing child mortality need to build on strategies to limit or reduce disaster risk.

### **5. Improving maternal health**

As environmental hazard stress or shock erodes the savings and capacities of households and families, marginal people within these social groups are most at risk. In many cases it is women and girls or the aged who have the least entitlement to household or family assets. Maternal health is a strategic indicator of intra- and inter-household equality. Reducing drains on household assets by reducing risk will contribute to enhancing maternal health. More direct measures such as investments in education and health will similarly contribute to household resilience as maternal health indicators improve. Children have already been identified as a high-risk group and maternal health plays a part in shaping the care received by young children.

### **6. Combating HIV/AIDS, malaria and other diseases**

The interactions between epidemiological status and human vulnerability to subsequent stresses and shocks are well documented. For example, rural populations affected by HIV/AIDS are less able to cope with the stress of drought because of a shortage of labor. Individuals living with chronic terminal diseases are more susceptible to the physiological stress of hunger. For diseases transmitted through vectors, there is a risk of epidemic following floods or drought, similarly the destruction of drinking water, sanitation and health care infrastructure in catastrophic events can increase the risk of disease.

### **7. Ensuring environmental sustainability**

Environmental degradation increases the vulnerability to natural hazards and often transforms a hazard event into a disaster. Environmental degradation compounds the actual impacts of hazard events, limits an area's ability to absorb those impacts, and lowers the overall natural resilience to hazard impacts and disaster recovery. For example, deforestation may aggravate the effects of heavy rainfall causing landslides and floods. Loss of mangrove forests reduces the natural protection of coastal communities against storm surges and tsunamis. Unplanned urbanization poses a challenge because it creates conditions that increase human vulnerability to disasters increasing the damage propensity. Informal settlement often takes place in highly dangerous locations, such as steep hillsides vulnerable to landslides, riverbeds prone to urban floods and near industrial installations subject to technological disasters. The target of achieving a significant improvement in the lives of at least 100 million slum dwellers by the year 2020 will be impossible without developing policies to confront their currently high risk from earthquake, hurricanes, flooding and drought. Natural hazards may also increase the risk of environmental degradation. For example, wildfires may result in deforestation and erosion, floods cause sedimentation and earthquakes may rupture gas pipelines or cause other types of industrial accidents with severe environmental impacts.

### **8. Developing a global partnership for development**

Efforts to enhance sustainable development by reducing human vulnerability to natural hazards are challenged by competing priorities in national development agendas and by political incentive structures that favor disaster response over risk management. International and bilateral organizations must help generate a framework of incentives that encourage the private sector, academia and civil society to create partnerships with national and local governments to address disaster prevention as an integral part of development policies. Strong efforts are needed to build global partnerships for development that integrate the reduction of disaster risk.

*Source:* Adapted from "Reducing Disaster Risk: A Challenge for Development," United Nations Development Program, 2004, p. 16.

agricultural practices. Poor people have less access to resources to help them recover from physical losses. They are less likely to have savings, insurance, or access to credit, which could help to finance reconstruction. Consequently, disaster victims are forced to take out high-interest loans (or default on existing loans), sell assets and livestock, or engage in low-risk, low-yield farming to lessen exposure to extreme events. People living under these conditions are more vulnerable to the impacts of natural hazards. Nearly 40 percent of the region's urban population lives in poverty. Approximately 20 percent to 25 percent of all urban poor live in hovels in overpopulated slums. According to the UN Millennium Development Goals Report 2005, the number of urban slum-dwellers in Latin America and the Caribbean grew from 111 million in 1990 to 128 million in 2001.

The severity of the economic impacts of a hazard event depends largely on various macro-level factors that reflect the vulnerability of the society or community. For instance, a severe drought that directly affects farmers also causes hardship for the poorest population in general, through the resulting increase in food prices. When a natural hazard event affects an important economic sector such as agriculture, fisheries or tourism, there is often a significant loss in production that results in reduced tax revenues, affecting the resources available for activities that might contribute to social progress. In the Caribbean, for instance, this is particularly true for the tourism industry, which can suffer both nationally and regionally from one devastating hurricane. Emergency response and reconstruction create significant new expenditures, which may, in turn, result in additional pressure for reducing government investments in social services.

The prevailing economic and institutional structure can increase vulnerability at both the micro and macro levels. In some countries current economic policies create disincentives for the use of technologies and behaviors that reduce vulnerability. This occurs through the use of tariffs, subsidies, or taxes that make activities that reduce vulnerability less financially attractive. Other policies, such as those that govern land use, hold implications for population density and distribution that affect the vulnerability of the overall popula-

tion. Another aspect relates to property rights: a poorly defined system of ownership may make land acquisition in safer areas more difficult. Lack of title may also provide a disincentive to investments in structural improvements to mitigate risk as well as make it hard or impossible to insure the property or obtain post-disaster aid for reconstruction.

### **THE POTENTIAL IMPACT OF DISASTERS ON THE IDB'S MISSION**

Natural hazards pose development challenges not only for IDB client countries, but also for the IDB itself. A recent review by the Office of Evaluation and Oversight (OVE) has indicated that the adverse economic impact of disasters may threaten the Bank's mission:

“Natural hazards threaten both development prospects in LAC and the Bank's mission which ... is to contribute to the acceleration of the process of economic and social development of the regional developing member countries. Natural hazards cause setbacks, at times very severe ones, and thus are at odds with the notion of acceleration of development.”<sup>11</sup>

The impacts of climate variability and change pose potentially large risks to projects, particularly those investment projects in the sectors of agriculture, housing, infrastructure, and energy.

Preliminary studies undertaken for the IDB have provided an estimate of the extent to which climate change poses a potential risk to its development projects.<sup>12</sup> The studies showed that: (i) a substantial number of projects (27 percent) contained elements that are possibly at risk to climate change, and (ii) that a fifth of average annual

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<sup>11</sup> Inter-American Development Bank. 2004. Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters. Office of Evaluation and Oversight. Document RE-292. Washington, D.C.: Inter-American Development Bank. p. 5

<sup>12</sup> Fareeha Iqbal. Presentation at the IDB, May 1, 2006. A study by the same author (with Ian Noble) on the World Bank portfolio reaches similar conclusions.



lending (US\$1.2 billion) tends to be at significant risk from climate-related impacts.

Disasters can affect the Bank's core mission and retard progress across each of its five focus areas: social investment and urban development; modernization of the State; competitiveness; regional cooperation; and environment and natural resource management. In order to provide effective assistance to accelerate growth the IDB needs to approach disaster risk management in the region as an investment in sustainable development.

### **INVESTING IN REDUCING VULNERABILITY**

Disaster losses in the region are on the rise and the gap between potential losses and the capacity of many countries to finance reconstruction has reached alarming levels. Natural hazard exposure should be a core development concern for most countries in the region.

A situation of vulnerability to hazards may be addressed by national, regional and local governments, together with the private commercial sector and the active participation of civil society. International agencies can provide financing and technical assistance. Risk management is an investment in sustainable development that can reduce costs and generate income. The *natural* disasters are not exogenous and uncontrollable events, temporarily departing from normality. Disasters are foreseeable, most often the result of cyclical events that can be reduced and in some cases prevented, by supporting people's ability to

avoid, resist and recover from their impacts. The vicious cycle linking poverty and disasters can be addressed with a pro-poor development focus that integrates disaster risk management. When the important and clear links to development are recognized, incentives opposing ex ante prevention and competing investment priorities can be overcome.

A growing body of evidence and experiences shows that there are often considerable economic and social gains in reducing risks rather than responding to disasters. Finance ministries should pay attention to investments in vulnerability reduction because disasters can have severe macro-economic effects on most national economies in the region. Ministries with responsibilities for productive sectors at high risk such as fisheries, agriculture, and tourism should consider investing to reduce their vulnerability and to overhaul planning, codes and legal frameworks to ensure that they adequately reflect the extent of the risk to the sector posed by natural hazards. Vulnerability reduction can be integrated as part of the focus of development programs and post disaster reconstruction. The IDB is committed to assisting countries to integrate disaster risk management into development policies and practices in the region by providing technical and financial assistance in collaboration with governments and donors as well as the private sector.

Development policies should reduce people's vulnerability to natural hazards in order to secure and sustain economic growth and social development.

# Current Practices

## PRACTICES IN BORROWING COUNTRIES

Development and disaster related policies have largely focused on emergency response, leaving a serious underinvestment in mitigation of natural hazards.

### Risk Management Institutions

Some countries in Latin America are beginning to broaden the scope of their national disaster systems to encompass preparedness, mitigation, relief and rehabilitation activities, and, in a few cases, even pre- and post-disaster financing options.<sup>13</sup> There have been three broad approaches. Most countries, like Chile, have increased the scope of disaster management by expanding the responsibilities of an existing institution such as civil defense. Other countries, like El Salvador, broadened the government's mandate for disaster risk management by creating a parallel institution responsible for risk evaluation and mitigation policy. Finally, a third approach, taken by Mexico, is to bring in, strengthen and reinforce a network of key institutions.<sup>14</sup>

The strengths and weaknesses of these organizational approaches depend on the larger context in which they operate. Whether centralized, loosely centralized, or networked, public programs should operate in a system with sufficient input, feedback and participation by the private sector, including actors in the marketplace and civil society. In those countries that have developed a national system for disaster/emergency management, civil defense agencies are often the lead entities in disaster related matters. National planning or eco-

nomie authorities have been involved only marginally.

### Emphasis on Response

To recover from the impact of natural hazards the countries of Latin America and the Caribbean have implemented a range of financial and nonfinancial measures. These actions afford some protection against hazard losses, but (with some notable exceptions) they tend to be of an ex post nature emphasizing emergency response and reconstruction. A survey of decisionmakers in Latin America and the Caribbean carried out in connection with an evaluation of the IDB's existing disaster policy<sup>15</sup> showed that 70 percent of respondents felt that emergency response was a high priority. Sixty percent rated reconstruction and rehabilitation as a high priority. A little over 40 percent placed a high priority on disaster preparedness measures to ensure effective disaster response. In contrast, just 20 percent placed a high priority on prevention (disaster reduction activities) and mitigation (structural and nonstructural measures taken to limit the adverse impact of disasters). When asked about the ideal situation, 90 percent said prevention *should* have a high priority.

The survey also showed that between 71 and 80 percent of disaster-related resources came through post-disaster lending, budget transfers to the affected communities, and post-disaster grants and aid. Pre-disaster financing measures such as reserve funds or insurance were only used to pay for some 20 percent of disaster-related spending. This is in spite of the fact that the survey ranked post-disaster lending the most expensive finance meas-

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<sup>13</sup> National disaster systems are defined as the formal and informal interaction between institutions, financial mechanisms, regulations and policies.

<sup>14</sup> Freeman, Paul, et al. 2003. *Disaster Risk Management: National Systems for Comprehensive Management of Disasters Risk and Financial Strategies for Natural Disaster Reconstruction*. Inter-American Development Bank, Washington D.C.

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<sup>15</sup> Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters. Office of Evaluation and Oversight. Document RE-292. Washington, D.C: Inter-American Development Bank. A survey of Latin American policymakers was commissioned as part of the study and carried out by Swiss Federal Institute for Snow and Avalanche Research SLF, 2004.

ure. Pre-disaster investments, reserve funds and insurance were ranked as less costly measures and community solidarity (bearing disaster damage fully at the local level) was ranked as the least expensive.

The emphasis on response is favored by the political visibility of actions and international solidarity to obtain emergency resources. Also, it is less complicated to achieve political consensus on responding quickly and forcefully to an emergency than it is to agree on how to make long-term investments in disaster prevention. This, in turn, is often reflected in the creation of powerful ad hoc institutional setups for fast response.

### **Prevention and Mitigation**

Despite a heavy reliance on ex post funding, some progress has been made in reducing vulnerability by using ex ante prevention and mitigation measures. In Nicaragua, for example, municipalities are using mapping technology to identify more precisely the degree and type of vulnerability their communities face. These measures can often be highly effective at channeling resources to reduce vulnerability and probable losses. Preventive measures start with risk identification and assessment and may include land use planning and building codes, which regulate human activity in hazard-prone areas in order to reduce risk. Other measures to reduce likely losses include environmental management, the integration of disaster risk management into education curricula, and public awareness campaigns that can change individual behavior and (for example) encourage reducing household risk.

Structural mitigation measures may also be effective at reducing vulnerability.<sup>16</sup> An example of a project with adequate ex ante mitigation investment is the Sabaneta Dam in the Dominican Republic. In 1993, the IDB approved a loan to strengthen and recondition the dam. The work was completed prior to the hurricane season in 1998. Several months later Hurricane Georges struck the island, but the reconditioned dam was able to ab-

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<sup>16</sup> See Appendix A for a more complete list of ex ante measures.

sorb and control 320mm of rain that fell in the San Juan river basin.

### **The Challenges to Financial Planning for the Countries of the Region**

Probable losses due to natural hazard events need to be factored into the financial capacity of countries to finance reconstruction obligations after a disaster. When Hurricane Ivan hit Jamaica in August 2004 it created challenges for both revenue collection and expenditures for the remainder of the fiscal year. At the end of August 2004, prior to the hurricane, revenues were on target and expenditures were 0.7 percent below budget, primary goals for the Jamaican Government. Because of the hurricane, revenue collections for September fell below target as business activities ceased in many sectors and some revenue offices had to be close in the pre and post Ivan period. At the same time, expenditures for relief efforts and reconstruction grew. Financing was expected from budget reallocations, grants from external sources and donations from private sector partners. Due to the high level of indebtedness, the country was not in a position to borrow for reconstruction.

When disasters occur, reconstruction is typically financed through budgetary transfers, the use of reserve funds, the diversion of current loans or grant funds, new borrowing and occasionally, new taxes. The use of each one of these sources presents challenges for the countries. Budgetary transfers and diversion of loan or grant funds are painful because these actions reduce funding for programmed development projects. The use of reserve funds is coupled with the politically difficult task of keeping such funds at the needed levels to meet other government spending needs, and new borrowing increases indebtedness.

The key obstacles to financial protection faced by several of the most vulnerable nations in Latin America and the Caribbean lie in institutional resistance to moving beyond emergency response. Ex ante planning would boost prevention in order to reduce risk, and establish sources of reconstruction financing before the disaster occurs. Defining the roles of civil society, private sector and financial market players would be important to disaster risk management.

## Regional Collaboration

The countries of Latin America and the Caribbean have formed subregional organizations to address risk management and disaster response issues. These include the Caribbean Disaster Emergency Response Agency (CDERA), the Center for Coordination of Prevention of Natural Disasters in Central America (CEPREDENAC), and the Andean Committee for Disaster Prevention and Care (CAPRADE). These subregional bodies can be centers for developing regional best practices and furthering the understanding of risk and vulnerability. In 2005 the Andean Community agreed on the “Andean Strategy for Disaster Prevention and Relief.”<sup>17</sup> In spite of these advances, the setup and focus of these regional bodies partially reflect national systems focusing more on disaster response than prevention. Therefore, their capacities to address disaster prevention and risk transfer issues has been limited.

## Participating in Global Initiatives

On January 22, 2005, the World Conference on Disaster Reduction (WCDR) in Hyogo, Japan, adopted the Hyogo Framework for Action 2005-2015 as a guiding framework for reducing disasters over the next decade.<sup>18</sup> The Hyogo Framework resolves to pursue the substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries by 2015. It establishes three strategic goals:

- The integration of disaster risk reduction into sustainable development policies and planning;
- Development and strengthening of institutions, mechanisms and capacities to build resilience to hazards; and

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<sup>17</sup> See Decision 591: Andean Strategy for Disaster Prevention and Relief: <http://www.comunidadandina.org/ingles/normativa/D591e.htm>

<sup>18</sup> United Nations International Strategy for Disaster Reduction. 2005. Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. UNISDR, Geneva, Switzerland.

- The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery programs.

Seventeen of the IDB’s borrowing member countries sent delegations to the Hyogo conference and have endorsed the Hyogo Framework of Action.<sup>19</sup> In addition many of the governments of these countries prepared substantive national reports to reduce disasters, specifying the status of the current capacities and policies in their countries in preparation for the WCDR.<sup>20</sup> Some countries have followed up after the Hyogo Framework of Action by creating national progress reports.<sup>21</sup>

## BANK PRACTICES

The Bank’s practice is to respond to demands from its borrowing members. This demand decides the Bank’s activities in financing disaster prevention and response. The Bank is determined to help strengthen the incentives and capacities for risk management in the framework of the disaster risk management cycle, and to help prepare the ground for efficient forms of risk transfer and financing (see Appendix B). To put this into practice, the IDB has an array of financial and non-financial mechanisms at its disposal. These and other financing options are reviewed on a regular basis in order to best position the Bank to offer its borrowing members an adequate array of financial instruments and incentives to comprehensively address disaster risk management.

## Financial Services

Between 1995 and 2002 the Bank allocated approximately US\$2 billion to disaster related

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<sup>19</sup> The IDB borrowing member countries that sent delegations to the Hyogo Conference were Argentina, Barbados, Bolivia, Brazil, Chile, Costa Rica, Ecuador, El Salvador, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, Trinidad and Tobago, Uruguay, and Venezuela. Source: UN/ISDR Secretariat, Geneva, Switzerland.

<sup>20</sup> These reports are available at <http://www.unisdr.org/wcdr/preparatory-process/national-reports.htm>

<sup>21</sup> These reports are available at <http://www.unisdr.org/eng/hfa/hf-implemt-states.htm>

loans.<sup>22</sup> These funds were distributed across specific instruments that support disaster related activities, as well as regular loans related to disaster management activities. Outside of loan activity, the Bank also provides additional financial resources through technical cooperation (TC) grants, trust funds or the Bank's Disaster Prevention Fund, as well as emergency TCs, the Disaster Prevention Sector Facility, and the Immediate Response Facility (IRF). In addition, new Bank

financing and facilitation for the Regional Disaster Policy Dialogue, a regional network of designated high-level country representatives. The Bank has supported this forum with subregional and yearly hemispheric meetings to discuss policy, financial and institutional issues, since 2001. Box 2 summarizes the necessary actions and available instruments to prevent, prepare for and respond to disasters.

Box 2: Bank Instruments for Disaster Risk Management		
Phase	Actions	Instruments
Before	<ul style="list-style-type: none"> <li>- Institutional development for prevention and mitigation</li> <li>- Risk and vulnerability analysis</li> <li>- Prevention, mitigation and preparedness investments</li> <li>- Financial protection design and support to risk transfer market development</li> </ul>	<ul style="list-style-type: none"> <li>- Disaster Prevention Facility loans (GN-2085-5)</li> <li>- Disaster Prevention Fund (GN-2405-3) and Multi-donor Disaster Prevention Trust Fund grants (GN-2427)</li> <li>- Sector investment loans with prevention and mitigation components</li> <li>- Technical cooperations for prevention and mitigation</li> <li>- Policy-based lending</li> <li>- Special funds such as those available under the Regional Public Goods initiative</li> </ul>
During	<ul style="list-style-type: none"> <li>- Damage and needs assessment</li> <li>- Reestablishment of basic services and critical infrastructure</li> <li>- Clean-up and repair of the environment</li> <li>- Humanitarian assistance (limited to emergency technical cooperation)</li> </ul>	<ul style="list-style-type: none"> <li>- Immediate Response Facility (GN-2038-12)</li> <li>- Portfolio restructuring and reallocation</li> <li>- Emergency technical cooperation (GN-1862-5)</li> </ul>
After	<ul style="list-style-type: none"> <li>- Rehabilitation and reconstruction investments</li> <li>- Adaptation of productive investments to future disaster risk</li> </ul>	<ul style="list-style-type: none"> <li>- Portfolio restructuring and reallocation</li> <li>- Investment and sector loans and grants for reconstruction</li> </ul>

instruments such as the Regional Public Goods Initiative (RPG) may also be used to finance proactive disaster risk management through nonreimbursable funding.<sup>23</sup> Finally, the Bank provides

#### *Disaster Prevention Sector Facility (GN-2085-5)*

The Bank makes available to its borrowing members the services of the Disaster Prevention Sector Facility (DPSF), which was approved in 2001 (see Bank document GN-2085-5). The resources of the

<sup>22</sup> Inter-American Development Bank. 2004. Evaluation of the Bank's Policy and Operational Practice Related to Natural and Unexpected Disasters. Office of Evaluation and Oversight. Document RE-292. Washington, D.C.: Inter-American Development Bank. p. 24.

<sup>23</sup> Under the Initiative for the Promotion of Regional Public Goods (RPGs) nonreimbursable resources of up to US\$10 million per year would be available to finance projects that support the development of RPGs in Latin America and the Caribbean. The premise be-

hind the Bank's support for RPGs is that many opportunities or problems shared by countries in the region can be dealt with more effectively at a regional level through international cooperation in the production of public goods. An RPG is any good, commodity, service, system of rules or policy regime that is public in nature and that generates shared benefits for the participating countries and whose production is a result of collective action by the participating countries.

DPSF are used to provide reimbursable financing of individual operations for an amount of up to the equivalent of US\$5 million when requested by borrowing member countries. The objective of the DPSF is to reduce the long-term risk from natural hazards to people, property and productive processes. The facility addresses the importance of ex ante action through several components to evaluate risk identification and forecasting, mitigation, preparedness, support for risk transfer, and institution building for national risk reduction systems.

This sector facility can support increasing the access to and quality of scientific knowledge about natural hazards and human vulnerability, particularly in real time, through early warning systems. Investments to be financed could also include structural engineering works, such as retrofitting hospitals and schools to withstand earthquakes, as well as nonstructural ones such as public awareness campaigns.

*Disaster Prevention Fund (GN-2405-3) and Multi-donor Disaster Prevention Trust Fund (GN-2427)*

These funds were approved in March and December 2006, respectively. Their objective is to help countries overcome a barrier to investing in disaster prevention by financing individual nonreimbursable operations, including studies concerning the preparation and design of prevention projects and components of loans in high-risk areas and sectors. Each individual grant is capped at US\$1 million for both funds. The main difference between the two instruments is that the Multi-donor Fund has no restriction concerning the percentage of resources to be used for the acquisition of equipment, while in the Disaster Prevention Fund the gap is 30 percent for this type of financing. Both funds can be used to finance private projects on strategic interventions to improve disaster prevention at local, national and regional level.

*Immediate Response Facility (GN-2038-12)*

The Immediate Response Facility (IRF) of 2003 is the Bank mechanism for providing urgent post-

disaster funding.<sup>24</sup> The IRF is designed to provide a swift pool of liquidity to address needs within the first three to six months following a disaster to restore basic services and help initiate reconstruction activities.

Activities funded under the IRF may include clearing debris and the environmental clean-up of the disaster area; control and stabilization of buildings; reopening critical physical infrastructure such as bridges and roads; establishment of vital basic utilities such as power, water, health-care and communications. In addition, upon approval of the Disaster Risk Management Policy, the Bank will conduct a review of the IRF to ensure consistency with the policy of 2007 and, in accordance with the Governors' Resolution of 2002, allow for IRF coverage of "non-natural, non-market unexpected disasters."

*Emergency Technical Cooperation (GN-1862-5 and AT-986)*

Emergency technical cooperation grants serve a humanitarian function and are much smaller in scope than the IRF (they have been capped at US\$200,000 since 2005). In these TC activities, the IDB seeks cooperation with specialized entities that have a comparative advantage in this area.

*Procurement*

Special procurement procedures apply for 12 months after a declared disaster, as described in the IDB's Special Procurement Procedures for Emergency Situations (GS-601).

**Nonfinancial Services**

The Bank provides nonfinancial support through technical advice and dissemination of best practices; environmental screening of Bank-financed projects; support for national and regional policy dialogues; the organization of national and international conferences; inter- and extra-regional exchanges; and resource mobilization and donor

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<sup>24</sup> The IRF was modified in 2003 and supersedes the Emergency Reconstruction Facility (ERF), created in 1998.

coordination. The Bank may also provide training and advise on the creation of national systems for disaster risk management. The Bank's knowledge function can play a strong role in affording more *ex ante* management.

### **Bank Coordination with Regional Entities**

Regional entities with which the Bank collaborates in disaster risk management issues include the Organization of American States, the Economic Commission for Latin America and the Caribbean, and the Pan-American Health Organization. It cooperates with subregional disaster organizations such as CEPREDENAC in Central America, CDERA in the Caribbean, and CAPRADE and the Andean Community in the Andean countries. The Bank also cooperates with the subregional development banks: the Caribbean Development Bank, the Central American Bank for Economic Development and Integration and the Andean Development Corporation. In addition, the Bank works with the World Bank and the UN Development Program on research concerning risk, vulnerability, and impact assessments. The Bank is currently working with ECLAC on a disaster information program to review methodologies and assess the impacts of natural hazards. The Bank also participates and collaborates with the ProVention group of bilateral donors, multilateral institutions and nongovernment entities working on reducing disaster risk.

Though the IDB's activities to strengthen its own capacities for disaster risk management and those of its borrowing member countries precedes the Hyogo Framework,<sup>25</sup> the Bank's strategic vision and activities support the Framework goals of: (i) integrating disaster risk reduction into sustainable development policies and planning, (ii) developing and strengthening institutions, mechanisms and capacities to build resilience to hazards, and (iii) a systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery.

### **FUTURE ACTION REQUIREMENTS**

The rising trend in disaster damages coupled with limited national and international resources for response, leaves a reduction in vulnerability as the only sustainable solution to reducing disaster losses. This approach calls for a disaster risk management strategy to encompass all stages of the disaster risk management cycle.

Core areas that require attention from the borrowing members of the Bank are *risk analysis* to identify the kinds and magnitude of hazards faced by people and development investments as well as the vulnerability of people, sectors and countries; *prevention and mitigation* to address the structural and nonstructural sources of vulnerability; *financial protection and risk transfer* to spread financial risks over time and among different actors; *emergency preparedness and response* to enhance a country's readiness to cope quickly and effectively with an emergency; and *post-disaster rehabilitation and reconstruction* to support effective recovery and to safeguard against future disasters (see Appendix B for an illustration of the key elements in risk management).

Appropriate disaster risk management standards at the country level will provide a foundation for the formation of a culture of prevention. Countries adopting good disaster risk management practices will enhance the effectiveness of their development investments and make them more sustainable. Since potential disasters affect development operations in different fields of activity, a cross-sectoral approach is necessary to effectively coordinate the use of resources for prevention in order to reduce potential losses. After implementing prevention and mitigation measures, countries still need to cover their remaining probable losses and should evaluate how *ex ante* financial protection strategies can play a role. These mechanisms allow for risk transfer that can shift risk to private sector partners through insurance and the capital markets.

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<sup>25</sup> United Nations International Strategy for Disaster Reduction. 2005. Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. UNISDR, Geneva, Switzerland.

### Box 3. IDB Priorities and Areas for Action in Disaster Risk Management

IDB Priorities	Rationale	Strategic Areas of Bank Action for Disaster Risk Management
<p><b>Social Investment and Urban Development</b></p> <ul style="list-style-type: none"> <li>• <i>Living conditions in cities</i></li> <li>• <i>Social safety nets</i></li> <li>• <i>Human capital formation</i></li> <li>• <i>Risk Management through environmental management</i></li> </ul>	<p>Social investments can directly or indirectly contribute to risk reduction by increasing the living standards of the poor and diminishing their vulnerability. Improved environmental management in urban areas will not only improve the daily life of inhabitants, particularly the poor, but can also help decrease the vulnerability of the poor to the effects of natural hazards. Uncontrolled urban settlements are rapidly increasing the level of vulnerability in many cities. Improving zoning and building standards as well as their application is a necessity in order to avoid future disasters of even greater magnitude than the once yet known.</p>	<p><b>Reducing the Vulnerability of the Poor</b>            Projects to reduce poverty and manage natural hazards attempt to respond to the risks and challenges that poor households and neighborhoods face. It is imperative that low-cost innovative and sustainable approaches be implemented to effectively reduce risks in low-income neighborhoods. Options include investing in building or retrofitting hazard-resistant infrastructure, for instance with financing from Social Investment Funds.</p> <p><b>Building a Culture of Prevention</b>            The Bank works to stimulate an effective demand for mitigation and safety. This can be done by empowering citizens through inclusion of disaster risk management in education curricula and awareness campaigns, improving the allocation of resources for mitigation, making governments and others accountable for managing risk, and monitoring the progress and performance of policies such as zoning regulations and building codes and standards.</p>
<p><b>Modernization of the State</b></p> <ul style="list-style-type: none"> <li>• <i>Governance</i></li> <li>• <i>Coordination between public institutions at different levels</i></li> <li>• <i>Alliances between the State, civil society, and the private sector</i></li> <li>• <i>Ethics and transparency</i></li> </ul>	<p>Better governance through citizen participation in decision-making processes, strengthened transparency, holding elected officials accountable for their actions, and improved cooperation between public institutions and the private sector improve the ability of civil society to demand better disaster prevention and response policies.</p> <p>To the extent that microfinance institutions are “healthy,” meaning that they comply with reasonable criteria for accountability and are well informed of their client base, they are in a better position to support most local production in developing countries due to their proximity to local businesses, which assures better knowledge of their needs and capacities and, therefore, faster and more efficient financing to resolve short-term liquidity needs in the wake of a disaster.</p>	<p><b>Building National Risk Management Systems</b>            Adding to the existing elements of emergency management, Bank actions support comprehensive national approaches that build on inter-institutional agreements between agencies responsible for forecasting, prevention, mitigation and response, including securing a sustainable financing strategy for the institutional set-up and actions. A comprehensive approach should include alliances between different levels of the State, civil society and the private sector.</p> <p><b>Risk Information and Indicators for Decision-Making</b>            The Bank works to ascertain projections of the occurrence of natural hazards and estimates of their impact. This can be used to establish a priority ranking of mitigation needs in a specific country, region or sector. It is important to increase the access to and quality of scientific knowledge about natural hazards and human vulnerability, particularly in real time. Information and communication technology and early warning systems can be useful and important tools to this end. Technologies such as GIS systems and Earth Observation Systems now exist that can be used for efficient gathering and organization of hazard risk information. The Bank supports the development of indicators and risk assessments to identify highly vulnerable countries and sectors, the level of exposure to natural hazards, to assess probable losses, and to evaluate institutional capacity to mitigate risk.</p>
<p><b>Competitiveness</b></p> <ul style="list-style-type: none"> <li>• <i>Infrastructure</i></li> <li>• <i>Private sector development</i></li> </ul>	<p>Improving the resistance to hazards of key infrastructure in trade corridors reduces the risks of delays in the delivery of goods and services. Helping countries to develop efficient insurance, retention, transfer and bond markets, improves competitiveness and can also stimulate better assessments of risk associated with natural hazards. By adequately pricing risk, insurance companies are in a position to provide powerful incentives for private investment in prevention, which would also reduce the implicit liability of the public sector. The business case for involvement in disaster prevention is rooted in an interest in business continuity and maintenance of environments conducive to investment and trade. Also, stakeholders’ expectations of business increasingly include good corporate so-</p>	<p><b>Involving the Private Sector</b>            The Bank works with governments to find ways to encourage the private sector to adopt mitigation strategies that will reduce some risk currently carried by the public sector. The Bank can assist governments to address underlying constraints that hinder the private sector from adopting risk reduction actions by, for instance, removing market barriers to entry, improving land use planning, property valuation and titling, building codes and risk assessments. In private sector projects, risk mitigation investments can be planned on a commercially reasonable basis.</p> <p>Environmental safeguards such as pollution prevention, contingency and emergency response plans can be put in place to facilitate sustainable production in case of disasters. These safeguards may, in turn, enhance competitiveness by showing corporate social responsibility and improving the image of the businesses involved.</p>



	cial responsibility.	
<b>Regional Cooperation</b> <ul style="list-style-type: none"> <li>• <i>Trade and integration</i></li> <li>• <i>Cooperation and coordination</i></li> </ul>	<p>Natural processes do not respect political boundaries. Many disasters in the region are the result of mismanagement of shared natural resources such as forests, soils and watersheds, whose administration requires cross-border collaboration. Therefore, regional cooperation on standards and regulations for competitiveness is an indispensable component of an effective risk-reduction strategy.</p>	<b>Fostering Leadership and Cooperation in the Region</b> <p>The Bank helps facilitate consensus among countries that leads to regional cooperation such as the coordinated management of watersheds and the interconnected networks of electric systems and highways. The Bank could assist in the creation of schemes to pool resources for risk retention. The Bank also works in partnerships with regional institutions. These can be developed to facilitate cooperation in risk reduction and provide a forum for intraregional and inter-institutional dialogue.</p>
<b>Environment and Natural Resource Management</b> <ul style="list-style-type: none"> <li>• <i>Natural resource management</i></li> <li>• <i>Urban environment and pollution control</i></li> </ul>	<p>Deforestation can disrupt watersheds and result in siltation of riverbeds, leading to more severe droughts and floods. Increased siltation of river deltas, bays and gulfs together with the destruction of mangroves and reefs increase the exposure to storm surge and seawater intrusion.</p>	<b>Safeguarding Natural Resources</b> <p>The Bank supports land use planning, watershed protection and pollution control that reduce the vulnerability of human settlements. It can also assist in physical and structural mitigation works to safeguard vital utilities such as dams and energy networks and potential pollution sources such as sewage systems and chemical plants. Reforesting watersheds and coastal zones, controlling soil erosion, proper waste management, and improving urban planning are all activities that can help reduce vulnerability.</p>

### Risk Financing

The establishment of a financial protection mechanism implies consideration of risk factors and is part of what can be described as an ex ante risk management strategy. This tool implies an understanding of probability and taking into consideration an unknown future. Setting up a reserve fund or buying insurance requires spending money today to make allowances for probable future disaster events. This is problematic, more so in developing countries where there are large immediate demands on government funds.

Despite a wide array of ex ante financing instruments, including some grant mechanisms, most disaster related financing in the region is done ex post. Affected countries rely on international solidarity, knowing that international institutions cannot easily withhold post-disaster aid.<sup>26</sup> The expectation of grants is a clear disincentive for ex ante action. Reconstruction financing may also take the form of reformulating existing loans or, in some cases, debt relief. None of these potential ex post measures targets vulnerability or loss reduction.

<sup>26</sup> Auffret, Philippe. 2003. "Catastrophe Insurance Market in the Caribbean Region: Market Failures and Recommendations for Public Sector Interventions." World Bank Policy Research Working Paper 2963. [http://econ.worldbank.org/files/23420\\_wps2963.pdf](http://econ.worldbank.org/files/23420_wps2963.pdf), p.27.

However, this situation can be address in several ways.

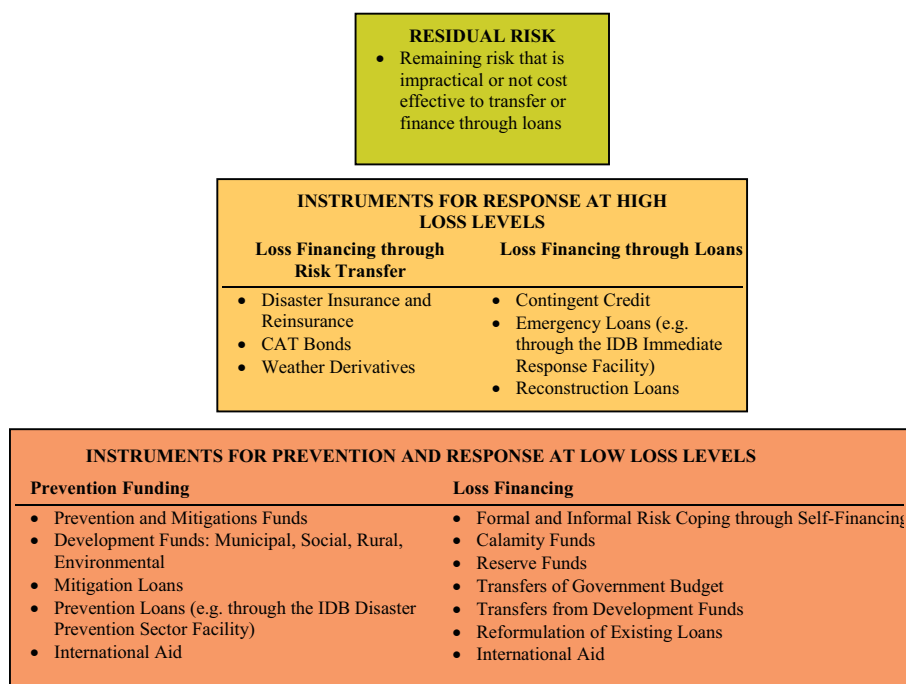
The risk bearers in the event of a disaster may be the government, the private sector,<sup>27</sup> or international entities such as the IDB. Identifying risk bearers allows the development of an appropriate risk management framework, which defines the roles and responsibilities of each actor. Disaster risk management strategies include risk reduction by increasing investment in mitigation and prevention. They also allow the use of a series of alternative instruments for loss financing.

Figure 8 identifies risk layers, loss financing options, and available risk transfer instruments. Higher risk layers are commensurate with higher potential losses.<sup>28</sup> In the case of a low risk layer, items on the left-hand side are measures to reduce risk and increase disaster preparedness. The right-hand side indicates mechanisms available to finance low layer losses. At this layer there is room for governments, the private sector, the IDB and the individual to reduce potential losses either by engaging in activities that reduce risk or by using existing formal or informal risk coping mechanisms. These response measures can be effective,

<sup>27</sup> "Private sector" refers to domestic private sector activity that is vulnerable to disaster risk, exclusive of domestic private sector insurance providers.

<sup>28</sup> This section is adapted from Miller and Keipi (2005).

**Figure 8: Financial Instruments for Risk Management and Transfer**



but do not transfer risk. In the case of greater losses, financing capacity at the lower layer may not be sufficient.

Insurance and other risk transfer mechanisms appear only as “high layer instruments” shown in the middle, left side of figure 8. In developed countries, transferring risks by means of insurance is

common among lower layer instruments. Box 4 describes prerequisites for a functioning insurance market. However, with some notable exceptions, insurance markets are poorly developed in Latin America and the Caribbean. Finally, there is always a residual risk, depicted on top of the figure, the financing or transfer of which may be impractical or not cost effective.

**Box 4. Prerequisites for a Functioning Insurance Market**

- *Acceptable quality of risks (building standards, regional planning, etc.):* This needs a combination of awareness, regulations and control. Without basic risk management in place, the insurance market will abstain from covering risks perceived to have a too high hazard.
- *Quantifiable exposures:* In Latin America and the Caribbean this is mainly a concern regarding the risk of flood and storm surge due to the lack of detailed enough exposure data and/or suitable hazard models.
- *Randomness of occurrence:* Insurability is conditioned to the probabilities of losses and not to the choice by the insured.
- *Majority of population can afford to pay for average costs of insurance cover:* Limited subsidies may be considered to prevent insurance coverage from remaining a privilege of the rich.
- *Local insurance companies sufficiently capitalized to pay for minor catastrophic events:* The reinsurance market expects the local market to retain some portion of the risks. It is better to have a few strong players than many weak ones in a given market.
- *Sufficient reinsurance capacity available to cover major cat events:* Currently there is ample reinsurance capacity available for any loss scenario from developing countries. However, affordability remains a crucial issue.

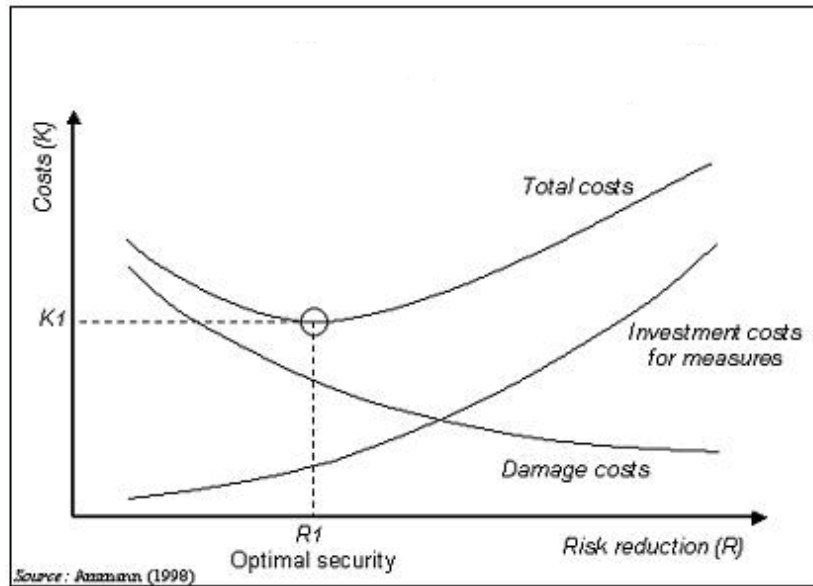
*Source:* Adapted from: Swiss Re, May 2003, Input for IDB Evaluation of its disaster related activities.

Figure 9 demonstrates the theoretical relationship of a balanced approach to risk management. On the ex ante side, increased mitigation and preventive measures will reduce future damages up to a certain point. In most cases, there will be a residual risk (i.e., it is not cost effective to prevent or mitigate all the risk).

On the ex post side, financing mechanisms can be used to cover the costs incurred by residual risk.

Financing mechanisms also play an important role by allowing governments to transfer risk; however, it is important to stress that although the government may transfer risk, it does not transfer the responsibility of providing post-disaster aid. A balanced ex ante and ex post strategy can effectively optimize security and costs since it does not rely exclusively on ex ante or ex post financing, but draws on each.

**Figure 9: The Optimal Level of Security at the Minimum of the Sum of Investments in Prevention Measures and Damage Costs**



# Bank Action Under the Policy of 2007

## OBJECTIVE

The purpose of the Disaster Risk Management Policy is to guide the Bank's efforts to assist its borrowers in reducing risks emanating from natural hazards and in managing disasters in order to support the attainment of their social and economic development goals.

There are two inter-related specific objectives of this policy:

- i) To strengthen the Bank's effectiveness in supporting its borrowers to identify and manage risks related to natural hazards by reducing vulnerability, and by preventing and mitigating related disasters before they occur.
- ii) To facilitate rapid and adequate assistance by the Bank to its borrowing member countries in response to disasters in an effort to efficiently revitalize their development efforts and avoid rebuilding vulnerability.

## SCOPE

The policy of 2007 has two sets of guidelines: directives that relate to programming and proactive project work, and directives related to the Bank's response to an emergency or disaster. Activities and instruments subject to the policy include the development of country strategies, financial and nonfinancial products, public and private sector operations and financial intermediation, as well as aspects of the Bank's project procurement practices.

Activities for post disaster operations cover both natural hazard events and physical damage caused by technological or human driven disasters, such as structural collapse and explosion.<sup>29</sup>

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<sup>29</sup> The prevention of technological disasters will be managed as part of the Bank's regular project design

Technological disasters refer to technological or industrial accidents, infrastructure failures or human activities, which cause loss of life or injury, property damage, social and economic disruption or severe environmental degradation. The prevention of these types of disasters is best addressed in the technical design and evaluation of the viability of each project. The Environment and Safeguards Compliance Policy pays particular attention to the treatment of pollution hazards.

The prevention of disasters caused by social and political violence (also referred to as conflict-driven disasters) will be treated separately from this policy since the planning and implementation of policies, strategies and measures that identify, reduce and help manage these events are very different than those necessary to manage natural hazards. For example, natural and technological hazards require technical prevention and mitigation measures, and usually result in social cohesion, while conflict-driven disasters require political prevention, and typically produce social fragmentation and erode social cohesion. See the recommendations of the IDB seminar "Human-Driven Disasters: Violent Conflict, Terrorism and Technology" held in June 2003 (Coletta, 2004).

## RELATION TO THE IDB ENVIRONMENT AND SAFEGUARDS COMPLIANCE POLICY

There are clear links between environmental degradation and an increase in vulnerabilities to natural hazards. For example, deforestation can aggravate the risk of landslides and floods. Loss of mangrove forests reduces the natural protection against storm surges and tsunamis. Additionally the registered increase in surface water temperatures in the Caribbean is leading to coral bleach-

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and implementation process in accordance with applicable sector policies, and through the Environment and Safeguards Compliance Policy (2005, draft). Epidemics and pandemics such as HIV/AIDS are also outside the policy scope. These are covered by the Bank's Public Health Policy (OP-742).

ing which in turn destroys natural storm surge protections. Climate change has also been linked to the reduction and loss of tropical glaciers in the Andean region, which will have an impact on the availability and distribution of fresh water as well as hydropower generation. Natural hazards may also increase the risk of environmental degradation. For example, wildfires may result in deforestation and erosion, floods cause sedimentation and earthquakes may rupture gas pipelines or cause other types of industrial accidents with severe environmental impacts.

The Bank is aware of these linkages and is striving to address them in a comprehensive fashion with the development of a number of new safeguard policies of which the Disaster Risk Management Policy is one. The Environment and Safeguards Compliance Policy (GN-2208-20) provides safeguards to ensure that all Bank operations and activities are environmentally sustainable, and do not cause environmental degradation that may be an underlying driver for increased vulnerability to hazards. It supports the principles of integrated resource planning and seeks to assist the borrowing member countries to implement sound natural resource management. It also covers the impact to the environment and human health and safety resulting from the production, procurement and use of hazardous material, including organic and inorganic toxic substances, pesticides and persistent organic pollutants. The Environment and Safeguards Compliance Policy defines criteria and procedures for requiring Bank projects to be submitted for Environmental Impact Assessment.

## **PLANNING AND PROGRAMMING ACTION AREAS**

The sections that follow provide the context and justification for the directives proposed in the draft Disaster Risk Management Policy. To motivate a shift toward proactive disaster risk management, the policy of 2007 will address areas of programming dialogue and project preparation and implementation issues with the borrowers (directives IV-A of the policy). Explanations on post-disaster policy elements are described in the subsequent section (directives IV-B of the policy).

## **Dialogue with Borrowers on Proactive Disaster Risk Management**

### *Joint IDB-Borrower Assessment of Disaster Risk Management*

In the context of the Bank's country strategy and programming, the evaluation of disaster risk and its review with country authorities is the most important tool the Bank has to enhance awareness of this threat to development and to encourage countries to allocate scarce resources to improve their risk management. It is also a critical step for improving the effectiveness of the Bank's development assistance, especially in high-risk countries. Incorporating appropriate risk management into country programming and portfolio management is the cornerstone of the Bank's proposed shift.

Currently, disaster risk information is not routinely collected during the preparation of country strategies and programming exercises, even for those countries that regularly suffer losses from disasters.<sup>30</sup> Estimates of probable losses that will have an impact on the country's macroeconomic outlook and the Bank's portfolio are not readily available. A country-level picture showing the geographical areas and sectors at high risk and the institutional capacities to manage risk is missing.

The economic, social and human impact of natural hazard events both in aggregated numbers and for each of the Bank's strategic focus areas individually, merits the collection of more detailed information on risk and vulnerability. This will help make disaster risk and vulnerability more transparent, thus providing a basis for more efficient decisions to resolve the development challenges of member countries.

Under the policy of 2007, the Bank will identify countries according to their level of exposure to

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<sup>30</sup> An analysis done by the IDB Office of Evaluation and Oversight showed that between 1995-2002 the country strategies for only two countries (Belize and the Dominican Republic) included elements of disaster risk management, although many more countries were subject to disasters due to natural hazards. However, many individual Bank operations (such as, housing, water, energy, and road programs) already incorporate analysis of natural hazards (Document RE-292).

natural hazards. This information should be integrated in the section identifying major development challenges in the issues paper prepared prior to the first stakeholder consultation. For countries that are identified as highly exposed the Bank will propose that disaster risk be assessed on a national basis. Risk assessment will facilitate the incorporation of disaster planning into country strategy and programming exercises. In partnership with member countries, the Bank will support technical work, tailored to the needs of country programming, in order to evaluate: (i) the country's disaster risk and the risk management priorities that will support the country's development objectives; (ii) the performance of current risk management measures and the governments' capacity to manage disaster risk in the context of their development priorities; and (iii) the exposure of the Bank's portfolio to natural hazards and potential implications. The reports will provide specific and well justified recommendations concerning: (iv) the opportunities for the Bank to manage the risk that disasters pose to the effectiveness of the country's development efforts and to the Bank's development assistance in particular; and (v) loan financing and technical assistance that the country needs for strengthening risk management in the context of its development priorities.

For these countries, country strategies and programming memoranda should include a section that quantifies the disaster risk (probable losses) and the potential impact on the country's macro-economic performance and the Bank's portfolio. The country strategy and programming documents should include a discussion of how the Bank proposes to manage the risk that disasters pose to the effectiveness of the Bank's development assistance. This includes the contribution of the lending, technical cooperation and nonfinancial products portfolio, as well as donor coordination.

### *Institutional Strengthening*

Institutional capacity in member countries plays an important role in implementing risk reduction measures. The Bank is committed to providing necessary support for institutional strengthening both at the national and local levels. Disaster risk management will require a cross-sectoral approach to facilitate broad cooperation among

stakeholders. The Bank recognizes that better and more comprehensive coordination between international development agencies is needed to build and strengthen capacities and to efficiently engage and collaborate with national and local authorities.

In the elaboration of the risk assessments and the country strategies, special attention should be given to the institutional capacity to manage risk; the vulnerability of lifelines and critical infrastructure; the adequacy of financial protection against disaster risk; and opportunities for regional cooperation to address shared hazards. If it follows from these assessments that there is a need for improvements, the Bank will support the appropriate policy adjustments and institutional strengthening, at the request of the country.

An appropriate institutional capacity to manage risk should consider the following components: (i) policies for disaster risk management; (ii) elements of a national system for disaster risk management with basic legal and financial provisions for a coordinating body and cross-sectoral cooperation including local levels of government and participation of private sector and civil society to improve prevention, preparedness and readiness to respond rapidly and effectively to disasters; and (iii) relevant disaster risk management standards (land use regulations, building codes, etc.), and effective mechanisms for their implementation.

### **Financing Projects to Withstand Potential Hazards**

In order to safeguard the viability of projects financed through loans, it is also necessary to evaluate the vulnerability of the projects themselves. If hazard risk threatens the project objectives, sufficient mitigation checks need to be enacted. This may include strengthening institutions, as well as structural or nonstructural mitigation measures. The level of risk should be identified on the basis of the intensity of the potential hazards and the vulnerability of the project activities to their impacts. The project teams should identify the level of risk in the project cycle and analyze it as part of the Bank's internal review process. In the absence of any other norms, projects should specify sufficient quality criteria for design and investment taking into account the impact of haz-

ard events estimated to occur within the lifetime of the project. The Bank should create sufficient safeguards to avoid rebuilding vulnerability particularly in infrastructure projects in high-risk areas.

Mitigation checks that could be enacted include, but are not limited to, strengthening early warning and communication systems; the preparation of contingency plans by communities, utility companies and other providers of basic services; equipping and training emergency responders; preparing and testing evacuation plans; and enhancing critical facilities, such as hospitals, clinics, and local shelters as part of a national emergency response system. In addition, insurance options should be considered for financing potential losses in private sector projects. International building standards, other available norms and experiences and good practices in the region should be followed in the Bank's project preparation and taken into account in its review process.

In the case of loans to protect infrastructure and strengthen emergency response measures, the Bank and the borrower should seek expert guidance in order to improve the viability of projects and reduce vulnerability. Project teams will consider risk posed by natural and technological hazards, based on the best available information. The Bank prepared a Disaster Risk Management Checklist (Sustainable Development Department Best Practices Papers Series No. ENV-144), a tool that will assist project teams to identify technical and institutional needs for integrating disaster risk management principles into the design and execution of sector loans where it is warranted.

For projects in high risk areas, the sections of the Project Performance Monitoring Reports (PPMRs) related to the achievement of development objectives, sustainability issues, and the implications for the overall performance of the project should explicitly analyze the impact of disaster events, and the mitigation measures carried out by the project.

## **Eliminating Potentially Negative Project Effects**

An additional concern is that the loan-financed projects themselves do not cause or contribute to unreasonably high risk levels. This is particularly important in the case of projects that may lead to technological hazard risk. Many forms of investments can increase risk. Expert opinion should be sought to provide risk management guidance to the borrower and the Bank, as needed. It is important to assess the risk on a project basis and when high sufficient safety measures and risk reduction precautions are incorporated. Appropriate mitigation measures can include the preparation and implementation of detailed plans focusing on risk reduction measures, periodic safety evaluations during construction and appropriate maintenance.

To support work in this area, IDB teams may draw upon the Environmental Safeguards Handbook that is being developed to support the Bank's Environment and Safeguard Compliance Policy. It contains guidelines, best practices and definitions to assist project sponsors, project teams, executing agencies and other interested parties. The Handbook is Web based and will be updated periodically to reflect evolving good international practices in the field. The Handbook and the Disaster Risk Management Checklist provide key questions to help Bank and country project teams to identify possible sources of concern in the applicable projects to be used as part of the Bank's internal social and environmental review process.

## **Financial Incentives for Risk Reduction**

Local communities, municipal governments, sectoral ministries and the private sector (the consumers of risk prevention services) need to understand the risks they face and should be empowered to protect themselves and their assets. Information sharing is essential to this end. It includes demonstrating the positive results of prevention and mitigation measures and providing readily accessible information about the hazards that communities face. An analysis of what makes them vulnerable, as well as their standing relative to other communities, can help make prevention a community priority. Financial incentives are valu-

able tools to signal the importance of prevention and mitigation to stimulate investment in new areas. These incentives can include subsidies for the construction of low-income housing in areas that are less prone to disasters, insurance schemes and grants for conducting studies of the feasibility of mitigation investment projects. The Bank can also help countries remove impediments to the development of insurance markets including by improving and making available information and through the design and establishment of appropriate market mechanisms for insurance and other hedging instruments

Investments in disaster prevention sometimes have relatively low private profitability but offer externality benefits for society as a whole. The Bank can play a pivotal role by offering incentives that increase the national rate of return on these investments. In other instances the Bank can provide the needed incentive by helping countries reduce the risks and uncertainty that arise from investments with long return periods, for instance through available grant financing, or by establishing a critical mass to secure economies of scale.

## **POST-DISASTER OPERATIONS**

### **Loan Reformulation**

Reformulation of loans entails significant opportunity costs. When an existing loan is reformulated due to urgent needs in the aftermath of a disaster, the development objectives of the originally designed operation for which the loan was approved, might be in jeopardy.

IDB loans may only be reformulated for disaster response purposes if the client country officially declares a disaster. The Bank will accept loan reformulation if the impact of the loan reformulation on long-term development goals have been evaluated, taking into consideration the consequences for the original intended use and objectives, and the proposed new use for the funds, thereby creating conditions for more informed decisions on the part of the approving authorities and relevant stakeholders. Adequate transparency of the reformulation must be assured and an adequate mechanism for monitoring and auditing the execution of resource transfers should be in place,

while taking into account the specific needs of timeliness given the nature of the situation. Reformulated loans must be monitored and audited through the Bank's monitoring/supervision system in a timely manner to assure the funds fulfill the new objectives.

As an additional requirement a share of the redirected funds should be earmarked to improve preventive disaster risk management and avoid rebuilding vulnerability. Some countries' laws and regulations specify this amount requiring, for instance, that a minimum of 10 percent of the redirected funds go to prevention and mitigation in order to avoid later repairs in infrastructure investments, as well as to developing new policies, training, increasing public awareness of disaster risk management, etc. Information from the OAS and PAHO indicates that in these types of projects investments in prevention and mitigation on the order of 5 to 7 percent of the total cost of new construction substantially reduce the probability of future losses. Retrofitting is much more expensive. According to an evaluation of 13 IDB reconstruction projects between 1995 and 2002 (RE-292), the average estimated investment in prevention and mitigation was only 4.5 percent.

### **Reducing Vulnerability in Reconstruction**

When the Bank makes new loans following a disaster it is particularly important to account for the vulnerability of future Bank-financed projects. The post-disaster period presents an opportunity to engage in project design and take into account lessons learned from the most recent disaster. This requires considering the environmental, social and economic changes in the afflicted area. It cannot be assumed that pre-disaster conditions persist in whole or in part. The reconstruction effort should be designed to assist the affected population in the reestablishment of adequately designed infrastructure to provide essential services and safety.

In designing reconstruction projects, the Bank emphasizes not rebuilding vulnerability. This is particularly important in the case of projects such as housing where lives are immediately at risk. Following the precautions outlined above, project risk evaluations should provide the necessary



safeguard against rebuilding or contributing to vulnerability.

### **Humanitarian Assistance**

Safeguarding human capital and protecting lives are essential in reaching economic and social development goals in Latin America and the Caribbean. Therefore, the policy of 2007 allows the Bank to fund humanitarian assistance when it is merited through emergency technical cooperations (GN-1862-5 and AT-986). The funds made available by the Bank should be administered through specialized nongovernment and international entities with specific expertise in this field. However, providing humanitarian relief is not part of the Bank's core mission since the Bank does not possess a comparative advantage in this field. The mission of the Bank is to contribute to the acceleration of the process of economic and social development, whereas the objective of humanitarian assistance is to provide temporary relief. Furthermore, humanitarian assistance is normally financed with grant resources and not loans, which is the Bank's core business. Finally, the Bank does not have adequately trained staff or sufficient capacity on the ground to be able to provide quick and accurate humanitarian assistance.

### **EVALUATING POLICY IMPACT**

In order to assess the progress in the implementation of this policy, the Bank will have an independent evaluation carried out five years after it enters into effect. The evaluation will cover all the directives but with a particular focus on the integration of disaster risk management in the programming process (A-1) and in the project cycle (A-2).

In order to improve the oversight and evaluation of the implementation of the policy the Bank will develop baseline and target indicators for monitoring results of integrating disaster risk management into country strategies and programming. In addition, performance indicators for disaster risk management in the project cycle will be prepared in connection with the elaboration of the corresponding guidelines. In ex post lending, the evaluations will focus on the fulfillment of eligibility criteria for loan transfers and the inclusion of sufficient resources to avoid rebuilding vulnerability. In reconstruction, attention would be given also to adjustments in policies and institutional deficiencies in order to reduce vulnerability to future disasters.

## Moving Forward

Investing in disaster prevention is increasingly recognized as a necessity to sustain growth and sustainable development in the region. The Bank and the donor community must increase their support to the countries and the region in terms of strengthening their capacity to undertake sound prevention measures and activities. Although, the Bank has a number of instruments that can be tailored to facilitate the countries' risk management and to improve their financing, there is still a need to strengthen proactive disaster risk management in order to focus on disaster prevention in the region.

The Disaster Risk Management Policy of 2007 embodies and supports a definitive shift from a reactive to a proactive disaster risk management. This change aims for the Bank to provide effective and efficient financial and nonfinancial support to the borrowing members in their disaster risk reduction efforts and improve their disaster risk management in accordance with national priorities and working towards the goals of the UN Hyogo Framework, established in 2005.

The policy creates opportunity for action. These include the following:

- Support to cross-sectoral structures for proactive risk management through national disas-

ter risk management systems with the participation of public and private entities;

- Assistance for the creation and application of disaster risk management standards;
- Support to country level hazard and vulnerability assessments, and risk monitoring;
- Financing of mitigation investments and of incentives to support prevention; and
- Generation of financial protection strategies, including risk transfer, to encourage risk reduction and to fund remaining reconstruction.

While the proposed policy represents a step forward in addressing natural and technological hazard risk by the Bank, progress will depend on the level of successful implementation of proactive disaster risk management by the borrowing member countries. Collaboration among all parties across the public and private sectors in the region, including a strengthening in the collaboration between international development agencies, is needed in order to successfully achieve proactive disaster risk management for the benefit of the people of Latin America and the Caribbean.

## Glossary<sup>31</sup>

**Disaster** – A serious disruption of the functioning of a society, community or a project causing widespread or serious human, material, economic or environmental losses, which exceed the coping ability of the affected society, community or project using its own resources.

**Disaster Management/Emergency Management** – The organization and management of resources and responsibilities in order to deal with all aspects of response to disasters/ emergencies including preparedness, contingency planning and rehabilitation.

**Disaster Risk Management (DRM)** – The systematic process that integrates risk identification, mitigation and transfer, as well as disaster preparedness to reduce the impacts of future disasters. It incorporates emergency response, rehabilitation and reconstruction to lessen the impacts of current disasters while avoiding rebuilding vulnerability.

**Disaster Risk Management System** – The formal and informal interaction between institutions, financial mechanisms, regulations and policies.

**Financial Protection** – The use of market-based financial instruments to secure ex ante funding to cover potential losses due to hazards and the costs of revitalizing the economy.

**Humanitarian Assistance** - The provision of commodities and materials required to prevent and alleviate human suffering during a disaster relief operation. Assistance in such circumstances is likely to consist of food, clothing, medicines and hospital equipment.

**Loan Reformulation** - Diverting loan resources already allocated to specific activities, in part or in full, in order to finance unplanned reconstruction.

**Mitigation\*** – Structural and nonstructural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

**Natural Hazard** - Natural processes or phenomena that have an impact on the biosphere and may constitute a damaging event. Such hazards include: earthquakes, windstorms, hurricanes, landslides, tidal waves, volcanic eruptions, floods, forest fires, and drought, or a combination thereof.

**Preparedness\*** – Activities and measures taken in advance to ensure an effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

**Prevention** – Activities to avoid the adverse impact of hazards and means to minimize related disasters.

**Proactive Disaster Risk Management** - Addressing the development challenges that lead to the accumulation of human vulnerability in order to reduce the effects of natural hazards that otherwise would generate disasters. An approach to disaster risk management that emphasizes ex ante over ex post.

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<sup>31</sup> Definitions marked with an asterisk (\*) are from United Nations. 2004. *Living with Risk*. International Strategy for Disaster Reduction. Volume I. Geneva. pp. 16 – 17.

**Recovery** – Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce future disaster risk.

**Risk\*** – The probability of harmful consequences or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

**Technological Hazard** – Danger originating from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Examples include: structural collapse, explosion, pollution and contamination or some combination thereof.

**Vulnerability\*** – The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

# Appendix A

## Recommended IDB Publications

Available from: [http://www.iadb.org/sds/env/publication\\_2530\\_e.htm](http://www.iadb.org/sds/env/publication_2530_e.htm)

## IDB Disaster Risk Management Focus

Inter-American Development Bank. 2000. *Facing the Challenge of Natural Disasters in Latin America and the Caribbean: An IDB Action Plan*. Inter-American Development Bank, Sustainable Development Department, Washington, D.C.

Keipi, Kari; Pedro Bastidas; Sergio Mora Castro. 2005. *Gestión de riesgo de amenazas naturales en proyectos de desarrollo: Lista de preguntas de verificación (Checklist)*, Inter-American Development Bank, Sustainable Development Department, Washington, D.C.

## Disaster Risk in Latin America and the Caribbean

Cardona, Omar Darío. 2005. *Indicators of Disaster Risk and Risk Management. Program for Latin America and the Caribbean*. Inter-American Development Bank, Sustainable Development Department, Washington, D.C.

CEPAL/IDB. 2000. *A Matter of Development: How to Reduce Vulnerability in the Face of Natural Disasters*. ECLAC, Mexico DF.

Chavériat, C. 2000. *Natural Disasters in Latin America and the Caribbean: An Overview of Risk*, Inter-American Development Bank, Research Department, Washington, D.C.

## Institutions for Disaster Risk Management

Bollin, Christina; Camilo Cárdenas, Herwig Hahn, Krishna S. Vatsa. 2004. *Disaster Risk Management by Communities and Local Governments*. Inter-American Development Bank, Sustainable Development Department/Integration and Regional Programs Department, Regional Policy Dialogue, Washington, D.C.

Freeman, Paul; Linneroot-Bayer, Leslie A. Martin, Reinhard Mechler, Georg Pflug, Koko Warner. 2003. *Disaster Risk Management: National Systems for Comprehensive Management of Disasters Risk and Financial Strategies for Natural Disaster Reconstruction*. Inter-American Development Bank, Sustainable Development Department/Integration and Regional Programs Department, Regional Policy Dialogue, Washington, D.C.

## **Challenges of Risk Financing**

Andersen, Torben J. 2005. *Applications of Risk Financing Techniques to Manage Economic Exposures to Natural Hazards*. Inter-American Development Bank, Sustainable Development Department, Washington, D.C.

Miller, Stuart; Kari Keipi 2005. *Strategies and Financial Instruments for Disaster Risk Management in Latin America and the Caribbean*. Inter-American Development Bank, Sustainable Development Department, Washington, D.C.

Pettersen, Ivar; John Magne Skjelvik, Nils Atle Krokeide. 2006. *Exploiting International Financial Markets to Manage Natural Hazard Risks in Latin America*. Inter-American Development Bank, Sustainable Development Department, Washington D.C.

## **Technological and Conflict-driven Disasters**

Coletta, Nat J. 2004. *Human-Driven Disasters: Violent Conflict, Terrorism and Technology*, Inter-American Development Bank, Sustainable Development Department, Washington, D.C.

## **Humanitarian Assistance (non-IDB source)**

<http://www.reliefweb.int/rw/lib.nsf/doc205?OpenForm>

## Appendix B

KEY ELEMENTS OF RISK MANAGEMENT					
Planning and Preparation				Response and Reconstruction	
Risk Identification	Mitigation	Risk Transfer	Preparedness	Emergency Response	Rehabilitation and Reconstruction
Hazard assessment (frequency, magnitude and location)	Physical/ structural mitigation works	Insurance/ reinsurance of public infrastructure and private assets	Early warning systems. Communication systems	Humanitarian assistance	Rehabilitation/ reconstruction of damaged critical infrastructure
Vulnerability assessment (population and assets exposed)	Land-use planning and building codes	Financial market instruments (catastrophe bonds, weather-indexed hedge funds)	Contingency planning (utility companies/ public services)	Clean-up, temporary repairs and restoration of services	Macroeconomic and budget management (stabilization, protection of social expenditures)
Risk assessment (a function of hazard and vulnerability)	Economic incentives for pro-mitigation behavior	Privatization of public services with safety regulation (energy, water, transportation, etc.)	Networks of emergency responders (local/national)	Damage assessment	Revitalization for affected sectors (exports, tourism, agriculture, etc.)
Hazard monitoring and forecasting (GIS, mapping, and scenario building)	Education, training and awareness about risks and prevention	Calamity Funds (national or local level)	Shelter facilities Evacuation plans	Mobilization of recovery resources (public/ multilateral/insurance)	Incorporation of disaster mitigation components in reconstruction activities
<p><b>Building and Strengthening National Systems for Disaster Prevention and Response:</b> These systems are an integrated, cross-sectoral network of institutions addressing all the above phases of risk reduction and disaster recovery. Activities that need support are policy and planning, reform of legal and regulatory frameworks, coordination mechanisms, strengthening of participating institutions, national action plans for mitigation policies and institutional development.</p> <p><i>Source:</i> IDB 2000. Facing the Challenge of Natural Disasters in Latin America and the Caribbean: An IDB Action Plan. Washington, D.C.</p>					