

Inter-American Development Bank • REGIONAL POLICY DIALOGUE

NATURAL DISASTERS NETWORK

**DISASTER RISK MANAGEMENT BY COMMUNITIES
AND LOCAL GOVERNMENTS**

Authors

**Christina Bollin
Camilo Cárdenas
Herwig Hahn
Krishna S. Vatsa**

This document is part of a series of studies commissioned by the Inter-American Development Bank for the Regional Policy Dialogue.

The opinions expressed herein are solely those of the authors and do not necessarily reflect the official position of the Inter-American Development Bank.

**Cover: Pendant in the form of a conch shell from the pre-Hispanic Quimbaya society.
Collection, Gold Museum – Central Bank of Colombia**

December 2003

Additional copies of this document may be obtained from:

Secretary, Regional Policy Dialogue
Stop W-0610
Inter-American Development Bank
1300 New York Avenue, N.W.
Washington, D.C. 20577

E-mail: dialogo@iadb.org

Tel: 202-623-2271

Fax: 202-312-4034

Website: <http://www.iadb.org/int/drp>

INTER-AMERICAN DEVELOPMENT BANK REGIONAL POLICY DIALOGUE

In December of 1999, the **Regional Policy Dialogue** was created as an initiative of the Board of Directors with the aim of establishing a space in the Bank for the expansion and exploration of dialogue between countries of the region and as a mechanism that would contribute to the exchange of experiences between countries, prepare them to face the vast challenges of globalization, and generate processes for regional cooperation. The Bank identified seven areas that were included in the Dialogue and created seven specialized networks, in which participate high-level officials with the rank of Vice Minister or the equivalent, charged with making decisions and designing public policies in Latin America and the Caribbean.

- 1) Trade and Integration;
- 2) Poverty Reduction and Social Protection Networks;
- 3) Education and Training of Human Resources;
- 4) Macroeconomic and Financial Policies;
- 5) Management and Transparency of Public Policy;
- 6) Management of Natural Disasters; and
- 7) Environment.

STRUCTURE OF THE DIALOGUE	
<p>General Coordination Integration and Regional Programs Department Manager: <i>Nohra Rey de Marulanda</i></p> <p>Regional Technical Cooperation Division Chief: <i>Juan Manuel Corredor</i> Coordinator: <i>María Carmenza McLean</i> Senior Specialist INT/RTC</p> <p>Secretariat <i>Marisa Taylor and Rodrigo Salas</i></p>	<p>Technical Coordination Sustainable Development Department Manager: <i>Carlos M. Jarque</i></p> <p>Legal Department Legal Advisor: <i>J. James Spinner</i></p> <p>Research Department Chief Economist: <i>Guillermo Calvo</i></p>
<p>Trade and Integration Network Deputy Manager and Technical Coordinator: <i>Robert Devlin, INT/INT</i></p> <p>Natural Disasters Network <i>Janine Ferretti, Division Chief SDS/ENV</i> Technical Coordinator: <i>Kari Juhani Keipi</i> Senior Natural Resources Specialist SDS/ENV Technical Assistance: <i>Victoria Imperiale</i></p> <p>Education and Training of Human Resources Network <i>Carlos Juan Carlos Navarro, Division Chief SDS/EDU</i> Technical Coordinator: <i>Viola María Espinola</i> Senior Specialist SDS-EDU Technical Assistance: <i>Norma García</i></p> <p>Management and Transparency of Public Policy Network Technical Coordinator: <i>Koldo Echebarria</i> Senior Public Sector Management Specialist SDS-SGC Technical Assistance: <i>Ingrid Carlson</i></p>	<p>Environmental Network Division Chief: <i>Janine Ferretti SDS-ENV</i> Technical Coordinator: <i>David Wilk</i> Urban Environment Specialist SDS-ENV Technical Assistance: <i>Niels Holm-Nielsen</i></p> <p>Poverty Reduction and Social Protection Network Division Chief: <i>Carlos Eduardo Velez-Echavarria SDS-POV</i> Technical Coordinator: <i>Wanda Engel Aduan</i> Poverty Reduction Specialist SDS-POV Technical Assistance: <i>Sabrina Passos</i></p> <p>Macroeconomic and Financial Policies Network Technical Coordinator: <i>Arturo Galindo</i> Research Economist RES Administrative Coordinator: <i>Norelis Betancourt RES</i></p>

ACKNOWLEDGMENTS

The Inter-American Development Bank commissioned the *Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH* to carry out this study.

Christina Bollin, Camilo Cárdenas, Herwig Hahn, and Krishna S. Vatsa were responsible for the preparation of the four components of the study.

The authors of the case studies were:

Vladimir Ameller Terrazas and Marco Antonio Rodríguez: Bolivia

Alberto Aquino: Peru

Claudia Cárdenas: Nicaragua

Ria Hidajat: Switzerland

René Jinon (ADPC): the Philippines

Alberto Maldonado: Colombia – financial considerations

Reinhard Mechler and Jürgen Weichselgartner: Germany

Alba Paulsen de Cárdenas: Colombia – institutional aspects and technical assistance

Juan Carlos Villagrán de León: Guatemala

The authors wish to thank all those who supported them with comments and revisions, especially Thomas Schaefer and Nina Boschmann, Rodger Doran, Omar Darío Cardona, Rolando Durán and Richard Vargas for their contributions, and Annette Heinrich for the final revision of the document. We would also like to thank GTZ Language Services and María Taboada, Juan Carlos Villagrán, and Nina Boschmann for the translations.

This study was presented at the III Meeting of the Natural Disasters Network of the Regional Policy Dialogue, in Washington DC, on March 6 and 7, 2003. Specific comments were received from the members of the Natural Disasters Network who participated at the Meeting, along with several Latin American and Caribbean experts: Barbara Carby, Patricia Durán de Jager, Cassandra Rogers, Victor Cárdenas, Carlos Costa y Carlos Villacís.

Kari Keipi, of the Environmental Division of the IDB's Sustainable Development Department (SDS), coordinated the preparation of the studies, with technical support from Victoria Imperiale of the Integration Department. Janine Perfit of SDS, Pedro Martel of the Operations Department of Region 1 (RE1), Caroline Clarke and Carlos Pineda of RE2 and Javier Cuervo of RE3, also took part in the team that carried out the initial analysis of the study.

PREFACE

The Natural Disasters Network of the Regional Policy Dialogue analyses the reduction of disaster risk through the exchange of experiences and good practices, an important challenge for the sustainable development of Latin America and the Caribbean. In the last ten years, disasters registered in the region have caused more than 45,000 deaths, 40 million directly affected and damages worth more than U\$S 20,000 million. Numerous lower-intensity phenomena that affect isolated locations are not registered, so this overwhelming number is probably considerably lower than the real impact of disasters in the region. Natural disasters not only cause death and destruction in the places where they occur, but they can also damage the country's economic development and produce significant negative effects in the gross domestic product, balance of payments, debt, fiscal balance and investment indexes.

This study refers to disaster risk management at the local level. The topic was selected by the members of the Natural Disasters Network of the Regional Policy Dialogue, and was presented during its III Meeting, on March 6 and 7, 2003. A decentralized risk management system, where local actors carry out a relevant role, may constitute a very effective way of reducing disasters in the region. Local governments must encourage the population's awareness of natural disasters, with the purpose of developing a culture of prevention and encouraging their participation in risk management. In this process, a vast spectrum of local actors may be involved, of both the public and private sectors, in order to achieve the purpose of participation.

The study complements the results of the first two meetings of the Network, which dealt with comprehensive risk management and financing mechanisms at the national level. The documents presented at the first two meetings have also been published by the Bank (Paul Freeman et al. 2003. *Gestión de Riesgo de Desastres: Sistemas nacionales y estrategias de financiamiento de la reconstrucción*. Washington, DC: IDB).

The Natural Disasters Network has maintained a direct relation with Central America's local governments through the Federation of Municipalities of the Central American Isthmus ("*Federación de Municipios del Istmo Centroamericano*"). Its President, Patricia Durán de Jager, participated in the III meeting as a commentator, and, in October of 2003, FEMICA organized a conference on risk management at the local level in Antigua, Guatemala, attended by mayors of that sub-region.

We are convinced that this publication will represent an important advancement in achieving a better knowledge of the best practices and benefits that disaster risk management represents for the region. This study will carry out the objectives of the Natural Disasters Network and of the Regional Policy Dialogue, since it fosters the strengthening of local governments, planning, mobilization of financial

resources, evaluation and the monitoring of advances in the diminution of disaster risk in Latin America and the Caribbean.

Nohra Rey de Marulanda

Manager

Integration and Regional Programs Department

Carlos Jarque

Manager

Sustainable Development Department



TABLE OF CONTENTS

INTRODUCTION AND EXECUTIVE SUMMARY	1
INSTITUTIONAL STRUCTURE	6
INTRODUCTION	6
LOCAL RISK MANAGEMENT IN THE SELECTED COUNTRIES	7
SUB-NATIONAL EXPERIENCES	12
STRENGTHS AND WEAKNESSES OF THE LOCAL ORGANIZATIONS IN DECENTRALIZED SYSTEMS	15
RECOMMENDATIONS	21
CAPACITY BUILDING AND TECHNICAL ASSISTANCE	26
INTRODUCTION	26
EXISTING CONCEPTS	27
COMPARATIVE ANALYSIS OF THE CASE STUDIES	29
CONCLUSIONS FOR A TECHNICAL ASSISTANCE STRATEGY	38
FINANCES	45
INTRODUCTION	45
STATE DECENTRALIZATION: ITS SCOPE AND DINAMICS	47
FISCAL AND FINANCIAL ARRANGEMENTS FOR DISASTER RISK MANAGEMENT	49
FINANCIAL SERVICES AND INSTRUMENTS FOR DISASTER RISK MANAGEMENT	55
CONCLUSIONS AND RECOMMENDATIONS	61
INDICATORS AND OTHER INSTRUMENTS FOR DISASTER RISK MANAGEMENT AT THE LOCAL LEVEL	65
INTRODUCTION	65
COMMUNITY BASED INDICATOR SYSTEM	66
TOWARDS A DISASTER RISK INDEX OF COMMUNITIES	74
MAIN FINDINGS OF THE CASE STUDIES	81
CONCLUSIONS	82
REFERENCES	84
LIST OF ACRONYMES	90

INTRODUCTION AND EXECUTIVE SUMMARY

In the third phase of the Natural Disasters Network of the Regional Policy Dialogue, the Inter-American Development Bank asked the Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation – GTZ) to prepare a study on “*Comprehensive Risk Management by Communities and Local Governments*,” with the purpose of analyzing mechanisms to prepare local actors for disaster reduction. In the two previous phases of the Dialogue, studies of institutional (Freeman et al. 2001) and financial (Freeman et al. 2002) mechanisms of risk management at the national level were carried out and discussed.

It is important to know that the definition of *risk* is “the probability of harmful consequences, or expected loss resulting from interactions between natural hazards and vulnerable or capable conditions”, and *disaster* is understood as “the actual impact causing widespread losses which exceed the ability of the affected community/society to cope with such a situation using its own resources” (ISDR 2002). Disaster risk management is the systematic development and application of policies, strategies and practices to reduce disaster risk. It tries to minimize the existing conditions of vulnerability to avoid (prevention) or to limit (mitigation and preparedness) adverse impacts of hazards in order to react to emergencies and act after disaster impacts (rehabilitation and reconstruction) (ISDR 2002).

In Latin America and the Caribbean, the concepts related to disasters are changing. Slowly, a transition is occurring from the vision that centralized agencies must deal with emergencies to comprehensive risk management by authorities from many sectors, with widespread participation of regional and local actors. As a reflection of this process, the co-existence of two approaches to local management can be identified: the historical tendency to organize local committees to respond to emergencies, still present in most countries; and a growing tendency, consolidated in only a few countries, of decentralization and strengthening of local capacity to comprehensively manage risk and disasters.

This evolutionary process is developing through different paths and instruments; for example, the Law Creating the National System for Prevention, Mitigation, and Response to Disasters in Nicaragua establishes the “*formation of committees in departments, municipalities, and autonomous regions as elements of the National System*.” In Bolivia, the Disaster Assistance and Risk Reduction Act establishes a broad principle of responsibility for the processes that generate risk and integrates the principle of decentralized management: “*The reduction of risks and response to disasters and/or emergencies is adapted to the concept of decentralization; for this reason, it was determined that the basis of the system are the Municipal Governments, who should be the first to assume this responsibility*.” In the Republic of Haiti, the National Risk and Disaster Management Plan establishes that “*the basis of the system is local capacity to manage risk and disasters*” and identifies the creation and strengthening of departmental, municipal, and local (community) committees as a priority. Nevertheless, although there have been important advances in terms of policies, plans, and approaches, the real involvement of local actors is still very rudimentary in most Latin American countries.

Therefore, in the course of the two preceding phases, the members of the Natural Disaster Network of the Regional Policy Dialogue decided it would be useful to study more carefully the necessities and possibilities of increasing the involvement of local actors in national efforts to manage risks. Conscious of the fact that a greater involvement of local actors requires strengthened capacities, financial mechanisms, and instruments to monitor local risks, the Dialogue defined the content of the study around four components:

- Institutional structure;
- Capacity building and technical assistance;
- Financing; and,
- Indicators and other instruments to manage risk at the local level.

The team of consultants prepared a specific analysis for each of the components by combining two work strategies: an analysis of existing concepts at the global level with an emphasis on Latin America and case studies. The latter was carried out by national experts in Latin American, European, and Asian countries, with the objective of understanding the mechanisms and local practices implemented in different national contexts. This procedure allowed the consideration of a wide range of concepts and practical experiences in drawing up recommendations and suitable models for risk management in Latin America and the Caribbean, in which local actors play a major role. The present document summarizes the results of the four topics researched.¹

This study seeks to strengthen and integrate local actors as essential elements within their respective national systems, so that they can contribute as much as possible to the reduction of the risks and disasters in their own territories. Here, it is necessary to keep in mind that local actors depend on the existence of appropriate national political, legal, and institutional frameworks, in a decentralized context, in order to be as efficient as possible in their efforts to reduce risks in their jurisdiction. Therefore, the present analysis is not limited to an isolated study of local mechanisms and capacities, but instead considers the national context in its relationships to the local context, within an environment of decentralized functions and authority.

In this context, it is important to recognize the advantages that economies of scale may offer; these include, on the one hand, the operation and maintenance of a single unit for technical-scientific monitoring of the diverse phenomena in the entire country that offers technical assistance to all municipalities and, on the other hand, the set of activities that can be carried out jointly by various neighboring municipalities who share resources and costs. A typical case would be the integrated management of a river basin shared by various municipalities. For example, the municipalities that share a river basin might consider constructing and operating a community, early-alert system in only that one river basin. Another example is the case when municipalities, politically divided by the river, should contemplate the implementation of structural measures such as dredging and the construction of bulwarks on both banks of the river, for which only one study and project would be sufficient, permitting the municipalities to share costs and find a comprehensive solution to a joint problem.

The concept of risk management used in the study foresees the integration of prevention, mitigation, preparedness, response, rehabilitation and reconstruction.² This perspective also considers risk analysis to be an essential basis from which to be able to identify and define appropriate measures for risk reduction. Our understanding of the elements mentioned, and of the concept of capacity building, is based on the definitions contained in the preliminary version of the global review of initiatives to reduce disasters of the International Strategy for Disaster Reduction, published in 2002 (ISDR 2002).

The first component of the study (Chapter II: "*Institutional structure*") confirms the hypothesis that a decentralized system in which local actors play an important role is the most effective way of reducing disasters in Latin America and the Caribbean. The study focused on an analysis of the political, legal,

¹ The study is available on the internet: www.iadb.org/int/DRP or: www.iadb.org/sds/env. The four single studies with their appendixes are found at the web site of the GTZ: www.gtz.de/disaster-reduction. At the same place, one can also access the case studies prepared in the context of the project.

² The term *risk management* includes the entire range of experiences in risk and disaster reduction in the countries studied.

institutional and social aspects considered relevant for local risk management in the national context. This analysis yields the following recommendations:

- It is necessary to support municipal administrations in Latin America and the Caribbean so that they introduce risk management into the regional development activities under their jurisdiction according to the current legislation.
- Local institutional strengthening should not be limited to the existing emergency committees in the countries: it is necessary to develop the capacity of local governments in this area and it would be desirable for this to be done by designating one of their agencies to specialize in risk management, creating local funds for this purpose and establishing formal responsibilities (not informal or good will) for all the local, departmental, and national institutions that operate in their territory and, at the same time, defining areas of institutional integration with other social actors.
- The preceding proposals gain greater force and sustainability if the countries formally create decentralized national systems for the identification, mitigation, and transfer of risks, as well as for preparedness, response, and post-disaster reconstruction. Under these conditions, the localities then stop acting like isolated organizations and can manage their risks, taking responsibility for themselves, within a framework of policies, legislation, institutional structures, and departmental and national plans and programs. These allow them to assume responsibility for risk management with the human, scientific, technical, and financial support of the rest of the government, according to the principle of subsidiarity.
- Nevertheless, one must differentiate between the strategies required for countries with a high degree of political, administrative, and financial decentralization, those that are tending towards decentralization, and those with a centralized administration that could orient their efforts to a de-concentration of functions. In each of these cases it would be convenient to strengthen or create national systems. In some cases they would be decentralized and in others, centralized or de-concentrated. In all of these cases, there should be an effort to include the topic of risks in the different sectoral and local regulations that contribute to the consolidation of local power to manage risks.
- The unavailability of financial resources at the local level appears as a constant in the justification usually offered for not acting to reduce risks, and the greatest financial efforts are directed to the mitigation of critical risks and post-disaster recovery. It is crucial to place more emphasis on the adoption of non-structural measures that require less resources and aim to prevent the generation of new risks.
- It is essential to strengthen local actors and especially the local administration, above all, in small municipalities.
- Finally, a high priority should be granted to creating a culture of awareness, in which all institutions and citizens realize the importance of the risks and their consequences for development, especially the public and private local, departmental, and national leadership.

The second component of the study (Chapter III: *“Capacity building and technical assistance”*) describes the mechanisms that strengthen the capacities of relevant local actors, with the objective of proposing guidelines for the formulation of a technical assistance strategy to build local capacity to comprehensively manage risks. Therefore, the actors and capacities required to manage risks at the local level, as well as the methods and sources of technical assistance to strengthen these, have been identified. The most relevant conclusions of this chapter are:

- For comprehensive risk management, it is imperative to involve a wide range of local actors, both those from the public sector as well as private actors and the population with its organizations. These actors are present in the countries of Latin America and the Caribbean. Nevertheless, their involvement varies according to the country, municipality, and particularly between urban and rural zones.
- The capacities that require strengthening depend on the profile of local risk, the existing actors and capacities, and the national context. Greater strengthening is required with respect to

knowledge, management of risk reduction processes at the local level, and the integration of local efforts into the national processes. It is necessary to determine the demand for technical assistance in accordance with local needs.

- In Latin American and Caribbean countries, there is a broad range of technical assistance initiatives. The different sources at the local, departmental / regional, national, and international levels can each contribute to comprehensive strengthening of local capacities. Nevertheless, up to now efforts have been dispersed and have not covered all aspects and localities at risk.
- In order to ensure that the technical assistance offered is coherent, covers all relevant aspects, and reaches all the regions at risk, a coordinating body and/or efficient, permanent structures of communication and monitoring are required at the national level. This institutionalized support should be decentralized and should operate according to the principle of subsidiarity in order to be able to respond to local conditions in a more flexible manner and to make maximum use of the possibilities for mutual assistance by local actors, in order to increase the effectiveness and sustainability of local risk management.
- Given the scarcity of resources, it is necessary to determine the criteria for the prioritization of technical assistance efforts. This prioritization will depend on the specific realities of the country and localities (risk, actors, and existing capacities). Nevertheless, as a basis for the most specific measures, it is advisable to prioritize efforts to increase awareness, knowledge acquisition, and broad dissemination of information about risks and their management. Another priority is the organization and coordination of the relevant local actors and their integration into the national system.

The third component of the study (Chapter IV: “*Financing*”) focuses on financial and fiscal decisions for risk management at the local level, taking into account that the local governments are very diverse in their jurisdictions, capacities, and resources. The essential conclusions are:

- Local governments have access to different sources of local revenue, such as fees, taxes, transfers, and loans. The most appropriate combination of these revenue sources for local governments will depend on their capacity and the public functions assigned to them. Although fiscal regulations vary in the different countries, the need for more revenue and allocation of resources to local governments has increased because of growing decentralization. Management of disaster risks is an emerging area of public responsibility, in which the role of local governments and other local organizations is being increasingly recognized.
- Local governments depend on their share of taxes and transfers from the government for the bulk of their revenue. Given the fact that revenues from their share of taxes are not always adequate to cover their expenditure requirements, they will always need transfers to cover the shortfalls. In reality, transfers or subsidies are the principle sources of income for the majority of local governments. The national governments use these transfers to finance reconstruction and to establish reserve funds for disasters at different levels. These resources can be used to increase the participation of local governments in preparedness, mitigation, and reconstruction programs.
- The study recommends multiple instruments and services that function as security nets. Employment programs, social funds, and social insurance are important examples of publicly mandated social security nets that can be introduced at the local government level to reduce risks of disaster and other types of risks to which households and communities are exposed.
- In addition, the insurance and micro-finance programs that can be used as risk management mechanisms, *ex ante* and *ex post*, should be strengthened.

A number of recommendations can be made with regard to strengthening fiscal and financial regulations for the management of disaster risks:

- There should be greater support for public policy in the design and application of financial mechanisms. Innovative financing mechanisms may offer a basis for stronger public-private commitment to an approach that involves incentives for mitigation at the local level.

- Earmarked intra-governmental transfers can strengthen the risk-management initiatives of local governments.
- Local governments need to invest in infrastructure for emergency services and establish reserve funds for this purpose.
- Local governments can gradually work towards greater coverage through various types of insurance.
- National governments should undertake measures to increase the participation of local governments in post-disaster reconstruction programs. The assumption of these responsibilities by local governments must be supported through access to financial resources and the development of their capacities.

Finally, to improve the capacity of the communities and local governments to gauge the key elements of disaster risk, the fourth component was developed to facilitate community monitoring based on indicators (Chapter V: *“Indicators and other instruments”*). The use of indicators at the community level represents a novel and innovative focus in this context:

- The conceptual framework set up systematizes key elements of risk management based on the factors of hazard, exposure, vulnerability, and capacities and measures. The conceptual framework helps us understand the forces that are at work (factors) and serves to identify the most appropriate indicators. The resulting system encompasses a total of 47 individual indicators, arranged according to the four established factors and the factor components.
- The selection and formulation of the indicators was guided by the philosophy of a system used in environments with little data. Consequently, a questionnaire was developed to gather all the information necessary for these indicators, which was provided by persons with knowledge of the case at the community level. Scientific studies may serve to support this information, but are not essential.
- The information generated by the system of indicators helps decision-makers at the local and national levels to analyze and understand the disaster risk to which the community is exposed. The identification of vulnerabilities and deficiencies in capacities indicates areas of intervention for the reduction of risk.
- Periodic application of the system of indicators permits monitoring of changes in the time schedule and is a measure to evaluate the policies and interventions undertaken.

Case studies in Guatemala and Switzerland were undertaken in order to gain familiarity with the approaches of local risk management; the applicability of the system of indicators was confirmed, and the feasibility and utility of the results was illustrated.

In addition, there was discussion of the proposal to employ the indicators in a system of indices that would allow the individual and technical information provided by the indicators to be condensed, using values for “hazard,” “exposure,” “vulnerability,” and “capacities and measures” both as a general risk index and as concise, easily comprehensible figures. This index will permit comparison between communities even when they are exposed to different hazards and will facilitate interpretation of the data.

INSTITUTIONAL STRUCTURE

INTRODUCTION

Starting in the decade of the 1960s, the countries of Latin America and the Caribbean began a process of creating national institutions specialized in responding to emergency situations associated with the presence of dangerous natural phenomena.

With an increase in the frequency and magnitude of the disasters, it was concluded at the global level that it was not sufficient to be well prepared to manage these events, but that it was imperative to be organized to combat the causes of the disasters. Therefore, in the last few years different institutional models have been developed in the continent for this purpose, without sufficient clarity about the degree of efficiency of each of them in reducing risks. Thus, the participants of the Regional Policy Dialogue, sponsored by the IDB, decided to initiate this present study.

The study³ contained in the component on institutional structure has the specific objective of describing the current situation, the existing concepts or those adapted to the Latin American context, and the lessons learned, with the goal of testing the following hypothesis: a national decentralized system in which local actors play an important role is the most effective way to reduce natural disasters. This system is feasible in the countries of the region.

The institutional model to be adopted is perhaps the most polemical topic in Latin America related to comprehensive risk management⁴. Although the majority of the countries continue to emphasize emergency response and are basically organized for that purpose, today it is accepted that it is indispensable to develop forms of organization that stress reduction of the causes of the vulnerabilities and risks. In the same way, there is consensus - in general terms - in that most risks originate at the local level due to an inappropriate interaction between human activities and the natural environment. Therefore, the necessity for local actors to be more involved in the reduction of risks is put forward⁵.

In view of this, differences immediately arise between those who defend exclusively governmental models as the solution path and those who are in favor of allowing non-governmental organizations to develop programs with the communities; here, it is necessary to consider that if both government and non-governmental actors actively participate in regional development, neither should be excluded and the model to follow should be the integration of both. But, at the same time, another difficult issue to

³ The countries studied were Colombia, Guatemala, and the Philippines. In addition, the case of Switzerland was chosen as a “positive model,” based on highly decentralized, subsidiary institutional structures. The methodology of the study involved an analysis of the documentation available from various international sources of information and an in-depth analysis of Colombia and the Philippines, which have been attempting to develop a national system in this area for 15 years. In addition, Guatemala was studied as a country that is taking the first steps towards overcoming the traditional concept of disasters. In Switzerland, the study was carried out on the basis of existing documentation; in the other countries, there were also visits and interviews with local and national authorities as well as with non-governmental actors. That work was supported by national consultants. Subsection 2 presents the context of national institutions in each country. Subsection 3 investigates local institutions, the advances and achievements in the places visited, and the degree to which these achievements were dependent on the respective national frameworks. With this background, the conclusions and recommendations of the study are included. With respect to the general situation of risk in each of the countries, see pages (29-30); the case of Guatemala is similar to the other Latin American cases presented.

⁴ See Freeman et al. 2003. “Disaster Risk Management”, BID, p. 12 and 17.

⁵ See “El Desafío de Desastres Naturales en América Latina y el Caribe. Plan de Acción del BID”, 2000, p. 14.

resolve has been the difference between the emphasis on mono-institutional organization and that of systematically multi-institutional organization. If one accepts that the multiplicity of public, private, and civil society organizations linked to development activities are potential generators of risks and, at the same time, necessary for their effective reduction, it is difficult or utopian to expect that only one institution can solve a problem that cuts across all sectors, regardless of the resources at its disposal. Furthermore, if one adopts a model that integrates different development sectors and actors, the focus will be not only on preparations for response; interest in preventative and mitigating activities will also grow.

On the other hand, given the diverse levels of decentralization in the countries of the region, another issue that is being discussed is whether an acceptable and feasible institutional model for risk management in the continent should be decentralized, centralized, or de-concentrated; if a large part of the risks originate at the local level, it is logical that the decentralization of responsibilities, functions, and resources should contribute to more appropriate risk management. But in countries with decentralized public administrations, a process of de-concentration of functions could elevate the effectiveness of risk-reduction activities.

In addition, there are disagreements between those who argue that each isolated municipality can effectively manage its risks and those who insist that without an appropriate national political, regulatory, and institutional framework, the localities can make very little progress in this area.

The great challenge for the various approaches is to achieve sustainable political and financial models that help to effectively address the causes of the risks. In view of the consensus on the need for greater involvement of the local level, this study starts from the premise that a decentralized national system responds more easily to this urgent need. Based in this premise, the relevance of a multi-institutional focus and the possible role of NGOs will be analyzed. Furthermore, with a view to confirming the working hypothesis, the present analysis is not limited to an isolated study of the institutional aspects of the risks in the localities; on the contrary, examining the situation in the countries in order to clarify to what degree efficient local management of risks depends on the existence of appropriate national political, legal, institutional, financial, and social frameworks in a context of decentralized functions and competencies is seen as fundamental.

LOCAL RISK MANAGEMENT IN THE SELECTED COUNTRIES

With an analysis of the political, institutional, regulatory, and social framework related to the risks in each of the countries considered in the study, there is an attempt to examine to what extent the formal national framework creates conditions for effective local risk management. The next step is an attempt to corroborate these realities with the sub-national experiences of each country, which are contained in the next sub-section.

Colombia

Twenty years ago, Colombia initiated an extensive decentralization process in which the municipalities gained the autonomy to formulate and execute their development and spatial planning schemes, manage their public services, and monitor the environment and construction. The departments and municipalities have income of their own, and in addition, the Constitution stipulates that around 50% of the nation's ordinary revenues be transferred to them. The other 50% is administered through national agencies. Thus, Colombia is among the Latin American countries with the greatest local development autonomy.

Because of the disaster generated by the Nevado del Ruiz volcano, in 1987, the government proposed a National Strategy, with which it sought to introduce the concept of prevention into the

design of development, spatial, and regional planning, with the municipality as principle actor; it also assigned responsibilities to all those involved and created responsibilities for all who generate risks, with a view to encouraging all actors to take responsibility for themselves.

These policies became part of the law that in 1988 created the National System for Prevention and Response to Disasters, which operated according to clear principles of decentralization and subsidiarity. Subsequent laws, like the environmental law, the spatial planning law, and the law concerning earthquake-resistant construction, deepened the fundamentals so that, beginning with the municipality, the idea of prevention was present in all development activities, and the assignment of specific responsibilities for local administrations and for different national agencies was expanded.

Although most of the local administrations continue to stress preparedness, they acquired greater responsibility to respond with their own resources or attempt to obtain these funds for prevention, mitigation, response, and reconstruction in their development activities. This is reflected in the fact that, since the creation of the National System, a greater number of plans and programs for development and spatial planning have incorporated risk management. It should be said that the quality of this incorporation is deficient in small municipalities and rural areas. At the same time, the national and regional development and scientific-technical agencies have similar responsibilities in their area of authority; they must also extend subsidiary support of all kinds to the municipalities. Thus, in the last ten years, the scientific agencies created the National Seismographic Network and various regional networks, and the volcano and tsunami vigilance and warning networks; they also modernized the hydro-meteorological warning network and the flood-warning network in the largest river basins. In addition, they developed broad public information, educational, and housing relocation programs and adopted various mitigation measures in different parts of the national territory.

In the National System, the departmental administrations have the function of supporting the municipalities in risk management. Nevertheless, the role that the departments play is generally very weak.

The National Government and various local administrations have Emergency Funds. The National Calamity Fund is basically supported by the national budget and has the primary aim of providing assistance during emergency situations and to some information and training programs. As for emergency preparations and response, national capacity has grown notably; however, the majority of the municipalities turn to subsidiary aid from the departments and the central government for medium-sized and large-scale emergencies.

The National System created multi-institutional and multi-sectoral committees that offer policy advice to the authorities and coordinate the three government levels and a Directorate General in the Ministry of the Interior as a national policy and coordinating body. The majority of medium-size and large departments and municipalities and some national agencies have created risk management offices, financed through their own resources, but many of them are precarious.

In most municipalities, there are Citizen Civil Defense Committees and Red Cross volunteers. By law, other non-governmental actors must participate in the committees at the local level, but there is only partial compliance. Many labor, professional, and private consulting organizations advise the authorities on this topic. The transfer of risks by way of insurance is still very underdeveloped, but there are interesting experiences in this area, for example, in the agricultural sector and in housing finance, where insurance against every kind of risk must be obtained in the amount of the credit. Because of the 1999 earthquake, in which five departments were significantly affected, the national government contracted various NGOs to manage reconstruction in the affected areas.

Guatemala

Guatemala is characterized by a high degree of centralism that is reflected in the few responsibilities and little power of local governments to make decisions about the development of their territory and in the low institutional and financial capacity of the local level, with the exception of a few cities. Since 2002, a decentralization policy has been implemented, under which recent laws have assigned new responsibilities to the municipalities with respect to the formulation of development, spatial planning, urban control, and public service plans. Nevertheless, the instruments with which to carry out such functions indicate a process of de-concentration rather than decentralization in the short term. As mandated in the Constitution, the central government transfers around 10% of its ordinary revenues to the local level, although decision-making power over program and project investment is concentrated at the national level.

Within a framework of regional policies for disaster reduction agreed upon by the Central American presidents in 1999, Guatemala recently incorporated the topic in its social development and poverty reduction policies. Nevertheless, there is still no broad vision of the topic, above all, of the way in which it should be approached at the local level. Historically, the municipalities have not introduced the concept of prevention into spatial planning, nor do they have an earthquake-resistant building codes or hazard zoning studies. Thus, the greatest efforts in the country are presently directed to emergency preparedness.

Law 109 of 1996, which created the National Coordinator for Disaster Reduction (CONRED), regulates emergency response, but, at the same time, introduces the need for the state and civil society to work to reduce risks. The 2001 Social Development Law introduces very general related policies into development activities.

In relation to risks and disasters, two parallel institutional networks coexist in the country: the CONRED Coordinators and the Development Councils, but there is no systemic concept, because only these two coordinating bodies are involved, without generating responsibilities or real commitments for the local governments or for the rest of the government or civil society. The Coordinators basically, though not exclusively, coordinate preparedness and response, and the Councils introduce the topic in planning schedules. A proposal led by the Secretary of Planning and Programming of the Presidency (SEGEPLAN) and CONRED to create an Inter-Institutional System of Risk Reduction (SINAMRED), which, among other things, seeks to integrate the two institutional networks mentioned, merits greater political support, given that this is highly advisable. Through the National Emergency Fund, which has very few resources, CONRED supports the localities in times of emergency and with mitigation projects.

There are CONRED Coordinators and Development Councils, presided over by regional authorities, at the five levels of government. At the national level, the Executive Secretary of CONRED coordinates all the activities in the country. On the other hand, the Development Councils function under the leadership of SEGEPLAN.

Representatives of civil society organizations participate in both the CONRED Coordinators and the Development Councils. Promoted by CONRED and various other organizations, there has been a great deal of experience in creating community organizations around projects in areas of risk.

The Philippines

After only a short period of independence and in the context of very centralized power structure, the Local Government Code was issued in the Philippines in 1992 in order to initiate decentralization to the provinces, municipalities, cities, and villages, generating a dynamic of greater autonomy in local development. The villages ("*barangays*") recovered a tradition of municipal autonomy with active political and economic participation.

In the 1970s, policy principles were established to encourage each local government to take responsibility for its own security with respect to disaster response and the assignment of functions to all public agencies at the different government levels. Presidential Decree 1566 of 1978 set the bases of the disaster response organization and of the National Plan for Community Preparedness. As a result of the International Decade for Natural Disasters Reduction (IDNDR), increasing political emphasis was placed on risk reduction, with subsequent legal and programmatic developments that introduced prevention into different development areas.

The Local Government Code was strengthened by the recent creation of the National Disaster Management System, which incorporated legal developments in areas such as poverty alleviation; land use; building, structural, and fire codes; and standards for security and occupational health.

Structurally, the executive branch of government at each level is responsible for the different activities related to prevention, mitigation, preparedness, response, and reconstruction. The national government has the function of supporting local governments in cases of emergency. Each state agency must use its own resources to fulfill its responsibilities in its area of authority and to support the localities. Although this is very new and has weaknesses, the localities must include resources in their annual budgets for mitigation and preparedness activities. However, by law each locality must also earmark 5% of its regular resources each year for the Local Calamity Fund, which has the exclusive goal of responding to post-disaster situations that arise in its territory. The Local Funds are managed by the local governments. In addition, they are subsidized by the central government through the National Calamity Fund.

The National Plan establishes the mechanisms of coordination and horizontal and vertical integration between the various state agencies at the different levels and the private sector and civil society. At each territorial level, there is a Disaster Coordination Council, presided over by the respective head of the territorial government, with the objective of advising that government and guaranteeing institutional coordination.

In the local environment, civil society organizations participate in the planning processes and in operational aspects. Many local projects are carried out by community organizations or by NGOs. Economic protection measures, such as insurance, have been delegated to the private sector and NGOs, and structural mitigation measures are the responsibility of engineering and architectural organizations.

Switzerland

Switzerland has been a federal state since 1848 and has a long tradition of autonomous cantons, each of which has its own constitution, parliament, government, and courts. Development policies fall to the cantons and, in turn, each canton defines the level of autonomy of the municipalities with respect to planning, public services, and civil defense.

According to policies and legal standards, the Swiss Federation must guarantee the protection of human dwellings from natural hazards; the cantons and municipalities, for their part, must incorporate this protection into all the activities that impact the territory. Protection of the population is defined by a federal system that coordinates the different agencies involved.

There is a wide range of laws in the country concerning risk; the first regulations date back to 1876. The Federal Constitution and the Federal Forestry, Civil Protection, Spatial Planning, and Hydraulic Engineering Laws establish the responsibilities of the cantons in this regard. The Federation establishes the principles and monitoring of civil protection.

The cantons issue the regulations and rules to implement the federal laws, generate the bases for knowledge and mitigation of natural hazards, and autonomously regulate and transfer most of these responsibilities to municipalities. Cantons and municipalities provide resources, similar in magnitude to the subsidies received from the Federation for this purpose.

At the Federation level, risks prevention and mitigation is managed by an office of the Department of the Environment. As for civil protection, there is a Federal Committee responsible for inter-institutional coordination and the Civil Defense Office, dependent on the Defense Department. Currently, Switzerland is evolving towards a “confederated system for management, protection, rescue, and assistance in disasters and crises.”

Civil protection is based on the obligatory national protection service, which is present in the municipalities and cantons. The Swiss Association of Insurers plays an important role in the transfer of risks, given that fire insurance also covers the damage caused by most risks, except those of seismic origin. Property insurance is obligatory in Switzerland.

Comparative analysis of the countries

A century and a half of canton autonomy and of policies, regulations, institutional organization, and a culture of prevention throughout the country have established a radical difference between the achievements of comprehensive risk management in Switzerland and those of the other countries studied. This is expressed in a greater level of autonomy, self-responsibility, and local technical and financial capacity to implement preventative measures and, ultimately, in a very low degree of social, functional, and physical vulnerability. For their part, around fifteen years of Philippine and Colombian history in the same field allow us to identify notable advances in this area in these two countries in comparison with Guatemala, which is hardly taking the first steps in this direction, like the majority of Latin American countries.

Comprehensive legislation on subsidiary decentralization for development planning, spatial planning, preventative management of natural resources, and the principle of self-responsibility for all actors constitutes a fundamental structural instrument that Switzerland can use for local risk management. Colombia and, to a certain extent, the Philippines and other Latin American countries have been gradually developing similar, relatively efficient instruments for risk reduction.

The systematic, multi-institutional concept of Switzerland, somewhat similar to that being developed by Colombia and the Philippines in recent years, constitutes the basic strategy with which to operationalize the preventative concept in all development sectors and activities at the national and local levels.

That is to say, the national concept of decentralized policies, regulations, institutions, and planning is the fundamental framework for comprehensive risk management at the local level. It appears that this correlation has been understood by various Latin American governments that are currently implementing decentralized national systems.

This is valid for Nicaragua and Bolivia, countries that passed laws, within their respective decentralization processes, to create decentralized and subsidiary national systems for the reduction of risks. In these systems, the municipal administrations, using their own resources, have the primary responsibility to prevent, mitigate, respond, and reconstruct; the emergency committees are coordinating bodies and have no implementation responsibilities, as is the case in most Latin American countries. In both cases, responsibilities are assigned to different government bodies so that they work in this area using their own resources, responsibilities are established for those who generate risks, and the topic is incorporated into development planning, spatial planning, and public and private investment in the framework of sustainable development.

As for Costa Rica, it has the political and legal mandate to constitute a national system, while Honduras, Ecuador, and the Dominican Republic have been working in the last few years on laws with the same objective.

SUB-NATIONAL EXPERIENCES

The following presents an analysis of the situation in each of the localities visited in Colombia, Guatemala, and the Philippines with respect to local risk management and the relationship between this situation and the national policy, regulatory, institutional, and social framework of each country examined in the previous section.

Colombia

Work was carried out in Bogotá, the capital of the country, and in Manizales, the medium-sized capital of the Department of Caldas; in both cities, the principle risks are earthquakes, landslides, and flooding, primarily in the most socially depressed areas. These parts of the country are among those where the greatest progress has been made in local risk management.

For three decades, various regions and cities of the country have been working somewhat efficiently to mitigate risk. Nevertheless, beginning with the decentralization process and the creation in the decade of the 1980s of the National System that gave them greater autonomy, the local authorities in both municipalities have assumed the responsibilities assigned to them by the new laws. Thus, the local development plans of the last ten years have placed great emphasis on risk reduction. Nevertheless, because of problems of governance, poverty, migration resulting from the internal conflict, and economic interests of the landowners, there are still disorganized, illegal occupations in high-risk areas, thus increasing local risks.

The administration of the two localities, in all of their activities related to risk reduction and disaster response, is guided by national regulations approved in the framework of the National System; in addition, the concept of prevention has been incorporated in local regulations governing spatial planning, land use, the environment, and building codes.

Since the System was created, both municipalities, using their own resources and with minor support from the central government, have autonomously developed activities for prevention, mitigation, preparedness, response, and reconstruction. In these two cases, most municipal offices, such as those for risk administration, planning, health, education, public works, and the public service companies, take responsibility and use their own resources for activities related to risk in the area of their authority. Under the direction of the mayors' offices, Civil Defense, firefighters, and the Red Cross coordinate the activities of all the agencies related to preparedness and emergency response.

In each of the last eight years, Bogotá has earmarked sums that fluctuate between 4 and 15 million US\$ for its Emergency Fund, principally for prevention and mitigation activities, though also for response. A part of these funds is managed as emergency reserves. In addition, Bogotá counts on a comparable or greater amount of money from the investments of other municipal agencies. As for Manizales, it has also dedicated considerable resources, around two or three million US\$ a year, to risk reduction, making it the third most important item in its budget. In this way, the two municipalities, and especially Bogotá, have developed multiple preventative and mitigation activities in different areas, using resources from their municipal budgets and a small amount of assistance from the central government. These activities include: preparation of a hazards analysis, community

awareness and training campaigns; structural reinforcement of buildings, bridges, plants, and distribution networks; the construction of mitigation works; and the relocation of houses. Both municipalities have thus managed to reduce the number of flood and landslide victims in recent years.

The two municipalities have Committees for Prevention and Response to Disasters and offices that coordinate this, supported by their own resources. Bogotá has created coordination committees in the localities that are administratively divided, and each of these allocates their own resources to the areas in their development programs.

Civil society organizations participate in the Local Committees in Bogotá and in the advisory commissions of the two municipalities. Consultancy firms and the universities provide fundamental support, principally in the study of risks. Manizales, by way of a contract with a government insurer, has managed to get 30% of the properties to voluntarily pay for insurance against every type of socio-natural risk, together with their property taxes, and also has fire insurance for all its municipal buildings. Both cases are good examples for other municipalities.

Bogotá and Manizales belong to the group of large and medium-sized cities that have made notable advances in local risk management, but the same does not occur in many intermediate cities and in the majority of small localities in the country, which continue to stress emergency preparedness. As a result of the 1997 Spatial Planning Law and as a very important step in the country, in the last three years, 60% of the 1,098 municipalities in the country have employed the concept of prevention in their spatial planning, although with deficiencies, above all in small municipalities and rural areas.

Guatemala

The analysis covered the capital of the country and four municipalities: Villa Canales, La Gomera, San Vicente Pacaya, and Siquinilá; the poorest areas of these municipalities are affected by risks connected to threat of earthquakes, volcanic eruptions, hurricanes, floods, and landslides

None of the municipalities have emphasized risk mitigation, included it in government plans, or dedicated resources to that end. Only the capital, with the support of SEGEPLAN and beginning after recent national elections, is now taking the first steps to include the topic in its poverty reduction policies. Despite the problems of illegal occupation of urban lands, none of the localities studied has employed the concept of prevention in their spatial planning, hazard zoning, building codes, or environmental protection. The only legal standards on the topic of risks that are recognized in the five municipalities are those, which govern CONRED, although recognition is very limited.

The localities do not feel like a part of CONRED and view it as a national entity that supports them with resources in case of emergency or when urgent mitigation works are required. Only few national agencies and some Development Councils have undertaken mitigation works in the municipalities that were visited. With the exception of the capital, the mayors of the other localities stated that responsibility for risk reduction belonged to the national government and that the administrations did not have the legal power, the instruments, or the capacity to prevent occupation of risky zones, to mandate preventative measures in construction, or to relocate threatened populations. The Local Coordinators of CONRED in the five municipalities only meet during emergency situations.

In some of these municipalities, CONRED has supported the creation of community organizations for early warning and response to emergencies caused by floods and volcanic eruptions, with low levels of participation by local administrations and in direct communication with the national level of CONRED, but mitigation activities have been minimal. Various NGOs have operated in the municipalities, although almost always in post-disaster periods, without continuity after completion of their projects.

The Philippines

In this country, the provinces of Negros Occidental and Albay and the city of Naga were studied; each of these has been strongly affected by different hazards, including earthquakes, volcanic eruptions, typhoons, flooding, and landslides.

In the three cases analyzed, a great deal of emphasis was placed on preparedness and response to emergencies, and there was considerable capacity for this. Nevertheless, with respect to risk reduction, each situation is different. Very recently, Naga, on the basis of national policies and programs and in the framework of the National System to reduce risks, managed to introduce mitigation into the city's development planning. Albay has begun to pay regular attention to prevention and mitigation activities since the creation of the Provincial Disaster Management Office. In contrast, Negros continues to focus primarily on disaster warning and response.

In general, it can be said that the local level is applying the set of national laws related to risks, the majority of which have been passed only recently.

In the framework of the National System, authorities in the three localities are assuming the responsibility for and the coordination of mitigation, preparedness, and response work in their respective territories, with the support of the Coordination Councils of the National System.

The civil society organizations form part of the Coordination Councils; in addition, in the majority of municipalities, there are voluntary rescue groups. In Negros, there are the Rescue Federation and the Public Safety Academy. In Naga, various civil society groups, private organizations, and NGOs participate in the bodies and advisory commissions mentioned above.

Switzerland

According to the principle of subsidiarity, problems in Switzerland are solved at the level where they are produced. That is to say that the municipalities are responsible for the security of the population in the face of natural phenomena. The municipal governments invest resources in the prevention and mitigation of risks in the context of development policies. This refers specifically to spatial planning and natural resource planning, i.e., appropriate land use, preparation of risk maps, and construction and forestry measures. In general, the cantons offer advisory services and support to the municipalities in the areas of planning, organization, and techniques for the reduction of danger.

Cantons and municipalities autonomously decide what type of organization they need to manage risks and disasters. The protection system ensures coordination and cooperation between the police, firefighters, health services, technical services, and civil protection.

Comparative analysis of local experiences

There is a consistency between the degree of development of the cultural, political, normative, institutional, and financial aspects at the national level in the countries studied, and the level of development achieved in these same aspects at the local level for comprehensive risk management.

The principle instruments employed by the studied localities that demonstrate achievements or advances in risk management are quite similar. These are basically political, administrative, and financial decentralization; preventative development, spatial, and land-use planning; and monitoring of the natural environment and physical development from the local level.

Being a part of a decentralized and subsidiary multi-institutional national system has been a crucial factor in the increase of local resources for effective risk management and the availability of mechanisms to more efficiently integrate and coordinate diverse local actors involved in this area.

In a complementary way, the technical, financial, and administrative capacities achieved by local administrations in this area and the conformation of specialized agencies and mechanisms to integrate and coordinate actors have resulted in different levels of efficiency in risk management among the localities.

STRENGTHS AND WEAKNESSES OF THE LOCAL ORGANIZATIONS IN DECENTRALIZED SYSTEMS

Political frameworks

In the countries studied and in others of the continent, successful local risk management is based primarily on advances in national policies, strategies, and legal standards for risk reduction. Switzerland has the longest tradition of local risk management, supported by very long-standing national and local policies. In Colombia, the Philippines, Nicaragua, and Bolivia, risk management at the local level was clearly begun after the definition of national policies that assigned explicit responsibilities in this area. The achievements in Bogotá and Manizales, Colombia were largely the result of national policies established 15 years ago. In Guatemala, the initiation of activities is associated with recent policies in the areas of decentralization, de-concentration of services, and risk reduction.

The national policy framework that each country adopts constitutes the fundamental condition determining whether the local governments do or do not succeed in introducing the topic of risk, employing the concept of prevention in essential aspects of development, such as planning, spatial planning and land use, environmental and urban monitoring, building codes, and poverty reduction programs. The foregoing aspects were considered in the four case studies, as well as in Bolivia and Nicaragua, as key instruments for effective local risk management. Colombia is the clearest case where, beginning with the creation of the National System, municipalities, departments, and national agencies began to work in the mentioned areas as a key part of local risk management.

As Freeman mentions in his studies (Freeman et al. 2002), in general, neither national or local governments nor the private sector in Latin America have expressly and fully assumed their responsibilities with respect to the risks in all their activities; they have not formally incorporated the topic into the planning and budgetary processes, either. Switzerland has clear policies in these areas. Colombia and, to a lesser degree, the Philippines, are making progress in this area, albeit timidly, with the development of their National Systems.

In all of the countries studied and in others in Latin America, one perceives a favorable environment for formal national systems to comprehensively manage risk from the local level, but the degree of local power in this area is defined by the general level of decentralization in each country. In some countries, disagreements about which agency should head up the system have paralyzed these initiatives.

Table 1: Local risk management in the countries studied

Categories of analysis	Countries with high levels of local autonomy (Switzerland)	Countries with a recent decentralization process (Colombia and the Philippines)	Countries with a high degree of centralization (Guatemala)
POLITICAL	Long tradition of culture	Moderate or little culture of	Moderate or little culture

ASPECTS	of risk awareness, local autonomy, and policies for prevention and mitigation of risks, which are highly institutionalized.	risk awareness, high or moderate level of decentralization in the last few years, recent risk management policies, somewhat institutionalized.	of risk awareness, highly centralized with possibilities for de-concentration, recent risk management policies or only at the initial stages, and little institutionalization.
LEGAL ASPECTS	With a long tradition, risks are anchored in the Constitution and in the integrated framework of laws on development, spatial planning, and environmental and construction monitoring. Institutional responsibilities are widely distributed. Those who generate risks are held responsible.	The legal framework is moderately integrated and only recently have risks been incorporated into planning, spatial planning, and environmental and construction monitoring. Institutional responsibilities are moderately distributed. The laws establish responsibilities for those who generate risks, but their application is still rather limited.	Only a few laws consider the topic of the risks and they are not or slightly incorporated into development and spatial planning. Responsibilities are very concentrated in one or few institutions. Those who generate risk are not held responsible.
INSTITUTIONAL ASPECTS	There is a decentralized National System and the localities have the primary responsibility, with subsidiary national support.	There is a decentralized National System and the localities have the primary responsibility, with moderate or low levels of subsidiary national support.	The organization is based on a centralized agency. The localities have little or no responsibility in this area, with very little national support.
SOCIAL ASPECTS	The relationship between the state and society is highly institutionalized. High level of participation and integration of non-governmental actors with the localities.	The relationship between the state and society is in the process of being institutionalized. Moderate or low level of participation and integration of localities and non-governmental actors.	The relationship between the state and society is not or only slightly institutionalized. Moderate or low level of participation by other actors, but in general disperse.
FINANCIAL ASPECTS	The localities respond with their own resources in accordance with their risks. The federal government guarantees subsidiary support when local capacities are overwhelmed.	The localities respond with their own resources but, with only a few exceptions, these are very limited. The central government supports the localities, but the assistance is little compared to what is needed. There are national and some local funds, but with only a few exceptions, these are principally for emergencies.	A few localities have limited funds for emergencies. Principally, it is national funds that provide assistance during emergencies, but they are always insufficient.

On the other hand, in Latin America a tendency towards de-concentration and decentralization can be observed, although it is quite slow. As can be seen in Table 1, this would mean that the localities enjoy greater autonomy or political, administrative, and financial decentralization in the future, within the political and constitutional context of each country, giving them the powers, instruments, resources, and responsibility that would allow them to act with greater efficiency in local development

activities subject to risk. But one cannot overlook the fact that even countries with a higher degree of autonomy, such as Switzerland, are governed by the concept of subsidiarity, so that when problems exceed local capacities, higher levels of government assume the responsibility to come to their aid with the human, technical, and financial resources at their disposal.

With the exception of Switzerland, in the other countries studied and in general in Latin America, priority continues to be given to preparedness rather than to the mitigation of risks, although there are exceptions, such as the two municipalities analyzed in Colombia, without forgetting that in the latter country the general situation of the other municipalities is not like that of Bogotá and Manizales, because the National System has many different weaknesses.

In summary, the countries employing the concept of a decentralized multi-institutional national system demonstrate that local risk management is more successful and has a greater possibility of being sustainable if it creates mechanisms for greater integration with the diverse local and national actors and, in particular, with those related to development planning. One cannot ignore that problems of governance and of economic interests that may be affected by comprehensive risk management must be taken into account when attempting to establish policies, strategies, and plans to reduce these risks.

Legal frameworks

The laws that govern the organizations specialized in emergency management do not contain adequate instruments with which local administrations can comprehensively manage risks. Therefore, the countries studied, with very diverse degrees of decentralization, have or are seeking an integrated legal framework incorporating the concept of risk reduction. In the countries with greater decentralization, local authorities have the power to issue their own regulations, always within the framework of national laws. Thus, the Colombian municipalities visited passed regulations incorporating the concept of prevention into spatial planning, land use, the environment, and building codes.

Another very important aspect is that, in general, the developing countries have not established responsibilities for those who generate risks, whether they are public or private actors or citizens. While there is no such legislation, the risks will invariably continue to rise and investment to reduce them will be increasingly beyond the reach of the governments. In Latin America, only Colombia, Nicaragua, and Bolivia have these kinds of regulations.

Thus, laws that promote self-responsibility of all actors, the decentralization of responsibilities for planning and implementation to the local level, the distribution of responsibilities among all public and private levels and sectors, and the accountability of those who generate risks are fundamental; in addition, basic support is provided by laws that permit local administrations to regulate spatial planning, environmental management, and construction, and rules that establish organizational bases, as is the case of the decentralized national systems.

Within this legal framework, it is necessary for the Emergency Committees to carry out all their functions of advising and promoting the definition of policies and inter-institutional coordination; however, in order to prevent the responsibilities from being diluted, the function of implementing activities should be assigned to executing agencies of the local governments, not to the committees, because these should be deliberating bodies of multi-institutional consultation and coordination. With the exception of Guatemala, in the other countries studied and in Bolivia and in Nicaragua, this is how it is set up.

In all the countries, there are many dispersed regulations directly or indirectly related to the topic of risk that should be made better use of in order to strengthen local action, as well as to develop national systems.

Decentralization

Risks can be generated by the state, the private sector, or civil society. Thus, the study makes clear that local risk management is more successful in the countries where the basic concept for distribution of responsibilities holds each development sector, each public or private entity and civil society, responsible for the risks they generate and for risk prevention, mitigation, monitoring, preparedness and response in all the activities in which they engage, using either their own resources or those obtained from various national or international sources of financing, or making use of risk transfer. Except for Guatemala, the laws of the other countries studied and those of Bolivia and Nicaragua assign responsibilities to the different actors involved. In Colombia, it is clear that the responsibility of the local authorities in this area began with the creation of the National System, and already there are frequent lawsuits against public authorities and private firms for failure to fulfill their legal responsibilities.

In Switzerland, as is generally the case in developed countries, the principle of self-responsibility is clear. Therefore, Switzerland has established a comprehensive legal framework in the area of risk that begins with the principles of responsibility laid down in the Constitution and is subsequently developed and concretized in numerous sectoral laws at the federal and canton levels. On the other hand, in an environment of decentralization in the countries with relatively new national systems, the laws that create these systems establish the basic principles for the distribution of responsibilities in this area; these principles have been developed through sectoral laws, such as environmental, comprehensive security, regional development, and public and private investment laws. Among the municipalities visited in the continent, the Colombians show the greatest formal distribution of functions among local entities. A great deal of responsibility for risk management falls to the municipal offices, but some is also assigned to planning, environmental, health, education, public works, communications, scientific-technical, and public service offices, in line with their jurisdictions, in order to increase the effectiveness of risk management.

In Guatemala and, to a lesser degree, in Colombia, there are weaknesses in local risk management, including difficulties in inter-institutional coordination, low technical capacity, deficient flows of information and training to improve knowledge, evaluation, monitoring, and warning of risks and management of emergencies from the national level to the municipal administrations, particularly to the small municipalities. In general, the governments do not emphasize the importance of measuring risks in order to incorporate them into their development planning decisions and, if they do so, it is usually done inadequately.

Another problem in Latin American countries is that, given the high level of risks already in existence, without the legal bases to hold those who produce them responsible, the risks that each level must assume have not been defined. Thus, for political reasons, the national governments, lacking awareness of the future implications, have assumed unlimited and indiscriminate responsibilities, above all for reconstruction, with minimum participation of private resources in risk management.

With the exception of Switzerland, in the countries studied there are no government policies for risk transfer. In Switzerland, property insurance is obligatory. In Colombia, all government property is required to be insured, but compliance is only very partial, with justifications such as the high cost of insurance in the face of endless social needs that require immediate solution; furthermore, all housing credit must include insurance for the value of the same, which is rigorously enforced.

Institutional structures

With the exception of Guatemala, the other countries operate at the local level under the concept of a decentralized, multi-institutional national system, framed by the existing structure of the state, not in a parallel manner, but with distinct degrees of organization. In Latin America, various countries are tending towards the creation of this type of system and, in addition to Colombia, Nicaragua and Bolivia have already formally constituted such a system. In the countries studied, there are committees for inter-institutional coordination at all government levels and, in all the cases, their usefulness for integrating, optimizing, and coordinating the activities and the resource use of all the actors involved is recognized. The basic difference involves the fact that at the local level many operate on a short-term basis, only in cases of emergency, and do not permanently integrate the activities of the various public agencies.

Furthermore, in order to give continuity and sustainability to comprehensive risk management, the countries with national systems tend to create permanent risk management offices, at the municipal, departmental (canton or provincial), and national levels, in order to continually integrate the activities of all the sectoral offices. It should be mentioned that in Colombia, in addition to the Office of the National Coordinator, there are permanent risk management offices in various national agencies and in the majority of departments, and municipalities. To these is attributed, to a certain extent, the sustainability of the National System. In general, there are advisory commissions for specialized topics at the three levels; it was confirmed that this type of structure exists in the two Colombian municipalities visited and, similarly, in the two Philippine provinces.

In the countries mentioned and in Nicaragua and Bolivia, the intermediate levels between the central government and the municipalities (cantons, provinces, departments) have responsibilities in this area and in all the cases, the importance of their function is accepted. Nevertheless, in the countries with a long tradition of autonomy, such as Switzerland, this function is completely defined for all development activities and, consequently, for the area of risk - in contrast to the low level of definition in the countries with more recent decentralization. In Latin America, the role of the intermediate entities is, in general, very weak. Nevertheless, in Colombia, the departments played a decisive role in the development of the National System; today, with little prominence, many departments in the country continue to play a crucial subsidiary role, given that it is impossible for the national government to directly relate to 1100 municipalities in all areas. Thus, strengthening the intermediate levels is indispensable in the region.

In general, decentralized, multi-institutional national systems have strengthened the authority and the power of the municipal governments to reduce risk and respond to emergencies when they established permanent responsibilities for all sectors and actors and created mechanisms for integration and coordination with the rest of the government and civil society.

With very few exceptions, local capacity to analyze and comprehensively manage risks and manage financial and technical resources is generally very low. In most of Latin America, scientific capacity is concentrated in a few national institutions and, in general, they lack the capacity to transfer knowledge and information to the local level. For this reason, it is very common for municipalities, especially the small ones, to lack comprehensive knowledge of risks, which makes it difficult to incorporate risk into decision-making for development programs or means that it is poorly incorporated.

With respect to the disagreements about the agency that should head up the system, the tendency is towards national or local offices with the primary purpose of coordinating both response and sectoral development agencies, but each country must choose its own model on the basis of the prevailing institutional structure and legislation.

Participation by non-governmental actors

In the countries studied, non-governmental organizations are required by law to participate in the different levels of the risk-management structure. This participation is quite institutionalized in Switzerland and the Philippines, less so in Colombia, and very low in Guatemala; in this latter country, NGOs are only partially integrated with the local governments, despite the existence of community organizations for warning and response. In general in Latin America, the participation of non-governmental actors is on the increase, but it is still very precarious.

The participation of the population in this area cannot be considered in isolation from the degree of institutionalization of its participation in decision-making in all development areas and the degree of governance in each territory. Thus, it is indispensable for the participation of social organizations in Latin America to be institutionalized in the various mechanisms that integrate and coordinate local actors in this area. Nevertheless, it is necessary for this to be complemented by, among other things, the participation of government and civil society supervision and monitoring agencies in these mechanisms.

As was described above, the case studies found several examples of contractual delegation of short-term state functions to NGOs, private consulting firms, professional organizations, universities, and insurers in areas such as risk analysis, training, dissemination of information, reconstruction, and transfer of risk, a practice that could be more widely employed. In Colombia, the two municipalities have significant contractual relationships with private consulting firms, professional bodies, and universities in areas such as training, analysis, and risk mitigation. After the 1999 earthquake, the national government contracted NGOs for reconstruction of the affected area. The NGOs in the Colombian municipalities were not very involved in this area; those in Guatemala were more involved after the disasters, and in the Philippines their participation is quite institutionalized.

Apart from the hiring of private firms by the municipalities, the involvement of the private sector in local risk management is almost always defined by the level of self-responsibility assigned by law. There are also examples of voluntary collaboration. One sector that merits special attention is that of insurers, given their relevance for risk transfer. In Switzerland, the Association of Insurers plays a decisive role in risk transfer, given the fact that fire insurance also covers damage caused by most risks. In the Colombian municipalities analyzed, the most important public buildings and infrastructure are insured and in one municipality, there is an arrangement with the government insurer by which 30% of urban properties voluntarily insure themselves against every type of socio-natural risk, with relatively low premiums that are paid with property taxes.

It should be noted that the concept of prevention has not been supported by the institutional and civic culture in the continent, although some of the cases analyzed indicate that it is possible to advance in this area.

Financing

In general terms, it is evident that the municipalities with few resources have difficulty financing risk reduction activities with their own means. In the countries where the national government transfers human, scientific-technical, and financial resources, the municipalities have a greater chance of developing local risk management. In the case of Colombia, the municipalities do not receive specific resources from the national government for the purpose of risk reduction activities. The policy of the system is for each municipality to assign to the item of risk the budget priority that it merits when weighed against other sectors, but it must be underlined that no municipality can deal with its risks using only its own resources. Nevertheless, the starting point is for the municipality to assume management responsibility to reduce its risks.

Accepting the limited resources in all our countries and the different levels of resource transfer from the central government to the localities, an important achievement of the national systems consists in having made it possible for various local public agencies to begin to act with their own resources and the transferred resources at their disposal and to take responsibility for managing other, alternative resources for prevention, mitigation, preparedness, and response activities; this gives them greater guarantees of sustainability than when the responsibility is borne solely by the national level. To this must be added that, with the responsibilities that the national agencies also bear, the subsidiary assistance that these begin to provide to the localities becomes highly relevant in the national systems.

The cooperation of NGOs and international organizations in this area constitutes significant levels of support for many Latin American countries, but, given that much of the cooperation arises in the short term after a disaster and is usually of very brief duration, the programs are less effective and sustainable than they could be. This aspect should be taken into account by international cooperation organizations.

If governments can define the risks to be assumed by each level of government and establish strategies to transfer risk, local risk management would become more viable.

The unavailability of financial resources at the local level appears as a constant in the justification usually offered for not acting to reduce risks. It is indispensable to promote the idea among all local and national actors that numerous non-structural measures (in other words, measures distinct from mitigation works) that help introduce the concept of prevention into decision-making processes surrounding development activities and investments effectively reduce risk and are generally less costly.

RECOMMENDATIONS

As summarized in Table 2, we recommend that the countries of Latin America and the Caribbean promote the strengthening or the formal creation, depending on the case, of national multi-institutional and multi-sectoral government systems to comprehensively manage risks, in which, employing the principle of subsidiarity, local governments and the communities are the central actors responsible for identification, mitigation, and transfer of risks, as well as for preparedness, response to emergencies, and post-disaster rehabilitation and reconstruction.

This requires different national risk-management strategies in countries with political, administrative, and financial decentralization, those tending towards decentralization, and those maintaining a centralized administration or tending towards processes of de-concentration. National systems are useful in all of these; in some cases they will be decentralized and, in others, centralized or de-concentrated. The difference between these will be the jurisdiction and functions assigned to the local level, and the powers and resources available to the municipal authorities will therefore vary.

In all the cases, the strategies should be linked to the evaluation of risks, in order to integrate the policies focused on risk reduction with policies for development, environmental protection, poverty reduction, and productive diversification and in general with public investment programs, many of which contribute to risk reduction in indirect, invisible ways.

All the countries need to create a broad legal framework that tends to increase legal jurisdiction, decision-making powers, responsibilities and the availability of all kinds of resources at the local level, but at the same time, generates specific responsibilities for other government agencies.

Until a comprehensive legal framework is achieved, something that generally implies a prolonged process, it is crucial to take maximum advantage of the extensive prevailing legislation in each

country directly or indirectly related to the topic of risk, so that the municipalities, as part of a national system or on their own, develop development planning, spatial planning, land use, and environmental, urban, and construction monitoring activities that employ the concept of prevention; nevertheless, each case will be limited by the powers, authority, regulations, and resources available to local authorities.

The strategies should also take maximum advantage of national capacities that can contribute to the strengthening of local institutions for prevention, mitigation, preparedness, response, and reconstruction. However, for effective subsidiary assistance to the local level from the national and intermediate levels (departments, provinces), the scientific, technical, regulatory, and operative capacities of these latter levels and their mechanisms and instruments of transfer to the local level must be likewise strengthened.

The national systems should not be set up as agencies parallel to the government, but as an integral part of its modernization processes. Therefore, the existing structures must be used to maximum advantage, fully incorporating risk reduction policies and creating or designating very technically competent national, departmental, and municipal offices to focus on risk management; the purpose of these offices will be to permanently support the governments, promote policies and programs on the subject, optimize inter-institutional, horizontal, and vertical coordination with key municipal, departmental, and national actors, including those responsible for planning, finance, and the environment, and guarantee political, institutional, and financial sustainability of the system at all its levels.

In all the localities, but in particular in those highly centralized countries that have no formal national system, it is useful for local governments to sign permanent, or at least medium-term, agreements with departmental, regional, and national agencies, with the objective of thus strengthening integration, coordination, training, and technical support for those localities.

Table 2: Recommendations for risk management

Categories of analysis	Countries with decentralized national systems	Countries in the process of creating decentralized national systems	Centralized countries with possible de-concentration processes
POLITICAL ASPECTS	Promote a culture of risk awareness. Strengthen local systems and administrations in risk management, so that they can be incorporated into regional development, based on the evaluation of risks.	Promote a culture of risk awareness, creation of decentralized national systems, and the importance of incorporating risks into regional development, based on the evaluation of risks.	Promote a culture of risk awareness, creation of decentralized or de-concentrated national systems and the importance of incorporating risks into regional development, based on the evaluation of risks.
LEGAL ASPECTS	Continue to expand the comprehensive legal framework for risks in the areas of local and national development.	Promote the need to continue creating a comprehensive legal framework for risks in areas such as development, spatial planning, environmental and construction monitoring, and education and in order to grant the greatest possible authority to local governments.	Make use of the laws in existence to strengthen the local level in the area of risks and promote new regulations that incorporate risks into development and spatial planning, environmental and construction monitoring, and education.
INSTITUTIONAL ASPECTS	Strengthen local, regional, and national agencies of the system and expand the distribution of specific functions among all actors. Support or create permanent offices for local risk management. Improve the methodological instruments for the incorporation of risks into local and national development.	Promote the need to establish specific responsibilities for all local and national actors; primary responsibility should be at the local level. Promote the creation of local offices to manage risks. Promote the adoption of methodological instruments to incorporate risks into local and national development.	Promote the need to establish specific responsibilities for all national actors and to delegate functions to the local level. Promote agreements for assistance by the national level to the local level. Promote the adoption of methodological instruments to incorporate risks into local and national development.
SOCIAL ASPECTS	Strengthen integration with local non-governmental actors and support permanent agreements with local governments. Strengthen social monitoring and government monitoring agencies.	Promote the integration of local governments with non-governmental actors and permanent agreements between the two parties. Strengthen social monitoring and government monitoring agencies.	Promote the integration of local governments with non-governmental actors and the signing of permanent agreements between the two parties. Strengthen social monitoring and government monitoring agencies.
FINANCIAL ASPECTS	Strengthen the capacities and the mechanisms of	Create mechanisms by which national agencies support local agencies.	Create mechanisms by which national agencies support local agencies. See that

	national support for the localities. Improve capacity to manage resources in the localities. Develop strategies to transfer risks.	Encourage the national systems to assign to all actors the responsibility to use their own resources to manage risk. Develop strategies to transfer risks.	agencies in the national system have the responsibility to use their own resources to manage risks. Create or strengthen national funds with the capacity to provide comprehensive support to the local level. Develop strategies to transfer risks.
--	--	--	--

In all the cases, it is especially important to strengthen the role of municipal and departmental governments in the integration and coordination of the other organized civil society actors, such as professional and business associations, social organizations, universities, research centers, and NGOs, in order to facilitate their participation, back-up, and continuous advisory services to the localities; to this end, it would be useful to sign agreements similar to those mentioned above.

Whenever possible, local governments should contract private organizations to carry out short-term functions in areas such as risk studies, training, awareness campaigns and, when possible, during reconstruction and to develop strategies to transfer risk to the insurance sector.

The greatest financial efforts of the municipalities, and likewise those of the departmental and national governments, are directed at meeting the demands for mitigation of critical risks and post-disaster reconstruction. It is indispensable to place more emphasis on the adoption of non-structural measures, for these require fewer resources and fundamentally aim to avoid the generation of new risks.

Related to this, it is necessary to provide broad assistance to local governments and, in particular, to small municipalities, so that risk analysis becomes a key element in the decision-making process surrounding public and private investment. It is thus useful to promote the generation and/or dissemination of knowledge and of methodological instruments, including those for: identification, evaluation, zoning, monitoring, and warning of hazards, vulnerabilities, and risks; measurement of their impact on regional development; and also introduction of this knowledge in contingency plans, regional development and spatial planning, in environmental impact, pre-investment, investment, and design studies, and in construction processes and project operation.

At the same time, local administrations should be assisted so they can increase their management know-how and capacity and can enlist the financial and technical resources of different levels of government and also of the private sector, international and academic organizations, professional associations, trade unions, social organizations, consulting firms, NGOs, and risk transfer insurers for the purposes of risk management; a great variety of experiences with these various bodies was encountered in the countries studied.

Social monitoring and that of government monitoring agencies is a mechanism that can greatly contribute to the sustainability of the systems and this should be promoted in all the cases in the short term.

It is necessary to set up permanent monitoring and evaluation systems that permit measurement of both the evolution of the risks and the impact of the prevention, mitigation, and preparedness activities that are developed in each locality.

Risk-transfer strategies that involve the public and private sectors, as well as the definition of municipal, departmental (or provincial), national, and private responsibilities with regard to risks are a necessity that cannot be postponed.

Finally, it is necessary to initiate permanent information, training, and educational programs that produce a culture of awareness of the importance of risks and their repercussions on development and that encompass both the institutional and civil society sectors. They should be focused in particular on the public and private, municipal, departmental, and national leadership and on the parliaments, directing them to assume responsibility for risks they may generate and to prevent, mitigate, and respond to the consequences they may produce.

CAPACITY BUILDING AND TECHNICAL ASSISTANCE

INTRODUCTION

Given that the role of actors in risk management must be augmented in Latin America, the objective of the present chapter is to identify:

- The capacities that local actors require for comprehensive risk management and
- Adequate sources and methods of capacity building.

The analysis considers the features of a national technical assistance strategy that involves all the institutions and organizations relevant to capacity building.

The research carried out combines two ways of approaching the topic:

- Global analysis based on information available from different actors and countries, related to processes of local capacity building for risk management and emphasizing concepts and strategies oriented to Latin America and the Caribbean.
- Analysis of technical assistance practices and mechanisms in five countries (Nicaragua, Colombia, Peru, Switzerland, and the Philippines), taking into account the initiatives of a wide range of government and non-governmental actors at the local, national, and international levels. Also identification of processes of capacity building in different municipalities.

The study considers the capacities required and the efforts to strengthen them in relation to all areas of risk management, that is: risk analysis, prevention, mitigation, preparedness, response, rehabilitation, and reconstruction⁶. The capacities required are deduced, in this framework, from the functions assumed by local actors in the context of a strategy or a national system to reduce risks. The term *capacity* includes, in a broad sense, the available strengths and resources. Nevertheless, given the separate analysis of the financial aspects, *capacity* is here understood as the strengths, that is, the skills, which include the available and required knowledge.

Each step identifies the national context, the actors relevant to the local level, the capacities considered fundamental, and the recommended methods and sources of capacity building for local actors.

Capacity

A combination of all the strengths and resources available within a community or organization that can reduce the level of risk or the effects of a disaster.

Capacity building

Efforts aimed to develop human skills within a community, organization, or institution needed to reduce the level of risk.

Source: ISDR 2002

⁶ See note 5, p. 6.

EXISTING CONCEPTS

National level

The processes of institutional change, expansion of participation, and construction of comprehensive approaches lead to the assignment of more functions and responsibilities to local actors, particularly to municipal governments. Although there have been some efforts in the region (e.g. in the framework of SNPMAD in Nicaragua), there is still no systematic strengthening of the local capacities required to assume these new powers.

In most of the countries, a variety of attempts to strengthen local capacities have been made by multilateral financial organizations (IDB, Andean Development Corporation - CAF), United Nations and Inter-American agencies (PAHO, UNICEF, OAS), international cooperation agencies (SIDA-Sweden, SDC-Switzerland, GTZ-Germany), public-sector institutions; international non-governmental organizations (CARE, La RED), and national NGOs (CEPRODE in El Salvador, PREDES in Peru). Some of these organizations and an extensive group of researchers have developed concepts, guidelines, and technical support instruments (e.g. Mansilla 1996, WFP 2001, Garatwa and Bollin 2002, Coburn, Spence and Pomonis 1994, Bethke, Good and Thompson 1997, IFRC 2002, Lavell 2001). Nevertheless, although a great deal of experience has been gained and many instruments and interventions employed at the local level, there is still little knowledge of what is required and the concrete strategies, methods, and instruments for capacity building are in a very early stage of development and systematization.

Relevant actors at the local level

Various studies, guidelines, and concepts recognize the need for widespread involvement of civil society in national and local risk management (Lavell 1997, Mansilla 1996, IFRC 2002, ISDR 2002, Sánchez 2002, Bollin 2003). This need is based on a comprehensive and participatory vision of risk management, closely related to sustainable local development (e.g. Lavell 2000).

In the same context, emphasis is placed on the significant role of the local government and administration as a body that coordinates the actors and the efforts, above all, in the areas of prevention, mitigation, and reconstruction. It is also responsible to integrate risk management into local development strategies (local development plans, spatial planning, etc.) and is the principle actor charged with local risk management within national decentralized systems, such as those found in Nicaragua and Bolivia. In a national institutional and legal framework, it has the responsibility to promote comprehensive and sustainable risk management, involving the other relevant social actors.

Besides the local government and administration, other important actors include:

- The population, its leaders and community organizations, which can significantly contribute to the prevention and mitigation of risks (participation in concrete measures, adaptation of daily life to conditions of risk) and to improved preparation of the community in the face of extreme natural phenomenon.
- Local public administration representatives of sectors such as health, education, public works, and environmental protection, through the integration of preventative measures into their policies and activities. These representatives can also contribute to the reduction of risk in different areas corresponding to their field of specialization (e.g. the health sector in the prevention of and response to disasters).
- Private actors in various sectors, such as construction firms, educational and technical institutes, and environmental NGOs who have the possibility of managing risk from their specific areas of specialization (e.g. reconstruction of infrastructure, river basin management).
- The media can play an important role in raising awareness and disseminating information, both for prevention as well as for early warning and response to emergencies.

- The organizations that respond to emergencies (emergency committees, firefighters, Red Cross, brigades, etc.) and NGOs specialized in reconstruction and/or risk reduction activities.

Required capacities

The objective of strengthening local capacities for risk management should take into consideration that “the local level is a subset of the global and as such establishes intimate relationships with other regional levels, so that in both the creation of risk conditions and the interventions to reduce them, the higher regional levels play an important role and should be introduced into the formula for local management through cooperative and collaborative relationships initiated by and with local actors” (Laveil 2002). In this way, the process of capacity building should be composed of a series of elements at all regional levels: national, sub-national, and local. The observed set of required capacities is summarized in Table 3 (see the following page).

Capacity building methods⁷

The methods proposed for local capacity building are many (e.g. Coburn et al. 1994, ISDR 2002, Bollin 2003, Mansilla 1996). Those that are mentioned include: formal education; training (including the preparation of didactic material); advisory services (e.g. on the formulation of regulations); community organization and local committees; awareness campaigns; dissemination or exchange of information and experiences: promotion of individual measures (e.g. insurance) and incentives; and the active involvement of the actors in activities and processes.

The most appropriate methods to use depend on the counterparts (that is, on the agents that require and those that offer capacity building) and on the objective of the measure.

Sources of capacity building and technical assistance

According to the documented concepts and experiences, the actors that can contribute to local capacity building are found at five levels:

- Internal capacity building between local actors,
- Capacity building between actors of different localities,
- Support by national and sub-national institutions, organizations, and networks, or
- Advisory services by regional actors and networks (CEPRENAC, CDERA, PREANDINO, La Red etc.), and
- Assistance provided by international actors (e.g. OFDA, ISDR, ECHO, UNDP, bilateral cooperation, highly specialized technical institutes).

Table 3: Capacities required for risk management

Capacities required at the national level:
Design and creation of <i>institutional strategies and structures</i> with clear definition of the functions and responsibilities of each actor and level involved, as well as of the mechanisms of communication, coordination, and monitoring fulfillment of responsibilities.
Creation and monitoring of the application of <i>legal and regulatory frameworks</i> with a focus on comprehensive risk management that establishes or favors local and municipal management, with autonomy, own resources, and sustainability criteria.
<i>Integration of the topic into sectoral policies</i> , such as building codes, school curricula, environmental laws, agricultural and transportation development plans, with special attention to the local scale of sectoral management.
<i>Support for sub-national agencies</i> ⁸ in carrying out their functions through agencies such as Municipal

⁷ In the context of the present study, the term *technical assistance* refers to the assistance received by local actors to strengthen their regulatory, administrative, and technical capacities, etc. This support can come from various organizations and can include a great variety of methodologies.

<p>Development Offices and programs for regional development and river basin management. <i>Raising the awareness</i> of decision-makers and <i>promotion of a culture of prevention</i> in the society, related to continuous risk management (including the promotion of incentives).</p>
<p>Capacities required at the sub-national level (excluding the local level):</p> <p><i>Regional planning</i> in the framework of national legislation, respecting local autonomy. <i>Assisting local agencies</i> to carry out their functions. <i>Promoting exchange and coordination</i> between local efforts.</p>
<p>Capacities required at the local level:</p> <p>Establishment and application of <i>planning instruments</i> (spatial planning, land use, building codes) for risk management in the context of sustainable local development. Consideration of the risks in planning new investments and new projects. <i>Environmental protection</i>, that is, adaptation of land and natural resource use to risk conditions. Vigilance in the <i>application of local and national regulations</i> in order to prevent the generation of new risks. Continuous promotion and management of <i>organizational and coordination structures</i> for all the phases of risk management, including reconstruction after a disaster. Formation, equipping, and maintenance of <i>organizational structures for preparedness</i> and response to emergencies, in coordination with regional or national civil protection agencies. <i>Systematization of knowledge and experiences and exchange</i> between municipalities.</p>
<p>All the levels also require capacities for:</p> <p><i>Management of knowledge (concepts)</i> and experiences related to the generation of risks and recommendations for their reduction. <i>Risk analysis</i>, monitoring of the behavior (changes in the hazard and vulnerability) of the constituent factors. Establishment and maintenance of <i>mechanisms of integration of and communication</i> with the relevant actors, whether they are actors of the same level or different levels. <i>Monitoring and evaluation</i> of processes and impacts. <i>Organization of resources</i> and control of their use.</p>

COMPARATIVE ANALYSIS OF THE CASE STUDIES

Risk profile in selected countries (Peru, Colombia, Nicaragua, the Philippines, and Switzerland)

The natural events that generate the most disasters in *Peru* are earthquakes (1970: 70,000 dead), volcanic activity, floods, and El Niño. In 1982-83, the impact of this last phenomenon was quantified as follows: 350 dead and economic losses estimated between 1 and 3.5 billion US\$. The region of Piura remained under water for six months. Other natural hazards include landslides, strong winds, intense rainfall, forest fires, freezes, and hail. In addition to the large disasters, a series of small and medium-sized disasters has also had significant negative impact.

In *Colombia*, the history of disasters is equally extensive. As in the rest of the continent, here too, the cumulative result of a number of disasters of different magnitude is becoming one of the greatest concerns. In the last decades, various disasters have led to loss of life and losses in infrastructure, business, and the environment, and have shown a marked tendency to ever-greater destructive impact. Among the natural hazards are earthquakes (in 1999, direct and indirect damage totaled 1.9 billion US\$), landslides, avalanches, falling rock, erosion, earthquakes, tsunamis, volcanic eruptions,

⁸ *Sub-national* is understood as the various regional levels, which are different in each country: state, regional, departmental, provincial, municipal, and others.

soil settlement, flooding, drought, hurricanes, strong winds, forest fires, effects of the Pacific Phenomenon (1997-98: 564 million US\$ of damage), and biological phenomena.

Nicaragua is one of the Central American countries that face multiple hazards: volcanic eruptions, tsunamis, earthquakes, droughts, hurricanes, tropical waves, and landslides. According to ECLAC data (1999), the damage (direct and indirect) caused in Nicaragua by hurricane Mitch alone reached 987 million US\$, with a reconstruction cost of approximately 1.336 billion US\$.

In the face of these hazards, large sections of the population of these three countries live in conditions of extreme vulnerability: high levels of poverty, uncontrolled displacement of the population to urban areas, especially to those with little economic value, such as high-risk areas, poorly constructed and technically inappropriate housing, inadequate agricultural practices, uncontrolled exploitation of natural resources, and high levels of environmental degradation, among other factors.

In Asia, *the Philippines* are an archipelago exposed to a variety of natural events due to its geographic location. Tectonic plates and numerous volcanoes are found throughout the islands; typhoons are the cause of the greatest material damage. In 1974, a tsunami caused the death of 3,000 people, and in 1990 an earthquake resulted in the loss of 1,666 lives. In addition, the country is threatened by landslides and drought. Environmental degradation contributes to the unleashing of various hazards in the territory. Poverty and other factors similar to those in Latin America characterize the high level of vulnerability of the population. In addition, the presence of terrorist activities impacts the country and increases its level of risk.

In *Switzerland*, natural events include storms, floods, cold waves, avalanches, gales, drought, heat waves, forest fires, earthquakes, landslides, and parasites. The impact of these natural phenomena is felt above all in material damage (provision of temporary shelter and reconstruction of infrastructure) and rarely in injury to persons, which demonstrates the generally low level of vulnerability of the population.

Building local capacity for risk management

National context

The efforts to build local capacity vary significantly among the countries analyzed; nevertheless, a number of similar tendencies have been recently observed.

In *Colombia*, in 1987 an inter-institutional work team constituted with the assistance of UNDP presented to Congress the Law to Create the National System for Prevention and Response to Disasters, with the aim of establishing a comprehensive approach to the topic in the country. In 1989, the regulations to implement this law were issued for the operation of both the system and its coordinating body, by way of Decree - Law 919. Among the principle characteristics of the system that should be mentioned are: it covers the entire country and is permanent and it integrates different public private, non-governmental, and civil society organizations at the national, regional, and local levels. The National System is designed to work in an inter-sectoral, inter-institutional, and interdisciplinary manner, within a focus on prevention and sustainable development planning. It is decentralized: the principle responsibility lies with the municipal administration. It establishes responsibilities for the institutions that generate risk. Each regional level has a Committee for Prevention and Response to Disasters and should have at least one official charged with coordinating the area. The law that created the system established rules for the National Calamity Fund as a special national fund dedicated to meeting needs that arise in emergency and disaster situations; it also supports several preventative activities.

In *Nicaragua* there has been an intense process of institutional change as a result of the lessons learned from the large-scale disasters suffered by the country and the promotional capacity of national agencies and aid and technical assistance organizations (such as UNDP and CEPREDENAC). Starting in March 2000, the National System for Prevention, Mitigation, and Response to Disasters (SNPMAD) was created; it consisted of modern legislation, a comprehensive focus on risk management, and a participatory and decentralized approach. In this system, local governments "have the primary responsibility for the activities related to prevention, mitigation, preparedness, response, rehabilitation, and reconstruction within their territory" (Law 337), and they coordinate the multi-sectoral municipal committees. Nevertheless, both the approach and SNPMAD are relatively new and are in the process of consolidation. The local governments still do not have sufficient capacities and resources to carry out their functions.

Also in *Peru*, one can observe a tendency towards a comprehensive focus on the topic and a greater degree of coordination and institutionalization in the related technical assistance. Nevertheless and in contrast to the other two countries, the Peruvian National System and the Civil Defense Committees at the different levels are structured and organized only for response to emergencies. Their activities include raising the awareness of the population, simulations, and dissemination of information (games, signs, publicity spots, etc.).

In *the Philippines*, the National Disaster Coordination Council (NDCC) has a decentralized structure and a focus on preparedness and response to emergencies. It promotes self-responsibility for local governments and committees and the inclusion of private actors and the population. In urban zones and centers, this structure has been very effective in emergency situations; nevertheless, it has not been effective in rural and peripheral areas of the country. Since the beginning of the International Decade for Natural Disasters Reduction (IDNDR), there have been efforts to expand the focus, involving different actors in the national committees, but, because of lack of resources and of a clear definition of responsibilities, there has been no significant progress to date.

Switzerland is a highly decentralized country, where risk management is the responsibility of the local level (canton and municipality). At the national level (federation), framework laws such as the 1993 forestry law define the general guidelines and the functions of national and sub-national actors. Coordination is the responsibility of the Department of Environment, Transport, Energy and Communications (UVEK) and the Department of Defense, Civil Protection, and Sport (VBS), as well as the Federal Agency for the Environment, Forests, and Landscapes (BUWAL). The Civil Defense Agency coordinates with its local counterparts, who have a high degree of autonomy. The national level provides support in the form of conceptual guidelines, training, and coordination of shelters and equipment.

Local actors

In almost all the municipalities of *Colombia*, the Civil Defense is organized by volunteers. They constitute the largest operative force (25,000) in the country for emergencies and disasters. These organizations are subject to the direction and orientation of the respective mayors and Local Committees for Prevention and Response to Disasters. It is also the responsibility of local governments to draw up plans for spatial planning, within which they must carry out an inventory of hazards and an analysis of risk, as well as adopt preventative and mitigation measures, with the aim of deterring the continued urban developments in zones with risks that cannot be mitigated. Currently, around 60% of the municipalities have drawn up these plans. In the documents of the National Council on Economic and Social Policy (CONPES), a great deal of responsibility to integrate risk management into their policies is given to the public sectors and much emphasis is placed on the involvement of the population in prevention, mitigation, rehabilitation, and reconstruction (e.g. self-construction) activities. The Municipal and Departmental Education Committees for the Prevention and Response to Disasters draw up the school preparedness plans at the local level.

The National Civil Defense Institute (INDECI) of Peru, which is the formal head of the National Civil Defense System (SINADECI), has representatives at the local level to respond to emergencies. Scattered initiatives seek to integrate the various sectors (public and private) into local activities to prevent and reduce risks. Among NGOs, one finds some that are working on diverse topics and who at some point included the topic of risk reduction in their activities. Especially important are the local governments and administrations that must incorporate the topic into local development processes. Nevertheless, their capacities are still very limited. Similarly, the population and its municipal organizations are rarely involved in risk management.

In *Nicaragua*, the integration of risk management at the local level is relatively new; most actors (government, organizations that respond to emergencies, the population, different kinds of NGOs, and the public and private sectors) have some experience in the area of response, but very little in preventative and mitigation measures. Nevertheless, Law 377 now assigns broad responsibility to local governments and seeks the participation of the public sectors in the local SNPMAD committees. Within this framework, it also promotes the involvement of private actors and of the population.

In *the Philippines*, the 1991 Local Government Code strengthens the role of local administrations (municipalities, villages, and cities) in order to create, using assigned funds, a local committee to coordinate disasters, with a focus on preparedness and response to emergencies, under the coordination of the mayor. Widespread participation of public sectors, NGOs, private firms, and the media is sought for the preparation of contingency plans. In addition, the participation of the private sector includes organizing and equipping the rescue brigades and financial support to local committees. Nevertheless, this focus only reaches certain areas of the country, while in others there is not even a local committee. In those cases, the army, the police, and fire brigades manage emergency response.

In *Switzerland*, local risk management is the responsibility of the canton and municipal governments and administrations. These must prevent and mitigate hazards and ensure the protection of their population in the case of extreme natural phenomena. In the framework of government guidelines, municipalities and cantons must incorporate risks into spatial planning and natural-resource use. In addition, the regulations give the population a high degree of self-responsibility with respect to their living conditions (e.g. housing construction) and the purchase of insurance against damage caused by natural phenomena. The sectoral agencies of the public administration and private firms must implement related national guidelines (school curriculum, etc.) and existing regulations (construction, environment, etc.).

Capacities required at the local level

The analysis of the case studies of *Colombia, Peru, and Nicaragua* reveals that there is considerable capacity and experience relevant to local risk management in Latin America. However, the increasing frequency of disasters with elevated impact on the communities shows that these processes are incipient and require a great deal of investment to promote and strengthen capacities for local risk management.

The capacities identified that require strengthening:

- Greater knowledge and awareness of the processes that generate risk in order to promote attitudes of prevention and self-responsibility among all local actors.
- Improvement of the capacity of the actors to incorporate risk management into their daily activities.
- Development of methodologies to analyze risk and identify and implement priority management measures to reduce it, which may require the assistance of other actors. This also includes the generation and management of information and financial resources.

- Creation of and monitoring adherence to national and local regulations (construction codes, forestry law, municipal ordinances, among others).
- Adequate integration of the focus on risk management into development processes (municipal planning, spatial planning, adaptation of agriculture to risk conditions, integration of the topic as a cross-cutting theme into sectoral policies).
- Planning, monitoring, and evaluation of risk management processes and their impact. Follow-up of activities carried out.
- Promotion of cooperation between sectors and participation of the population in the activities and processes of local risk management, including coordination mechanisms.
- Coordination between local efforts, regional and national policies, and policies of other localities, through mechanisms of communication and the exchange of experiences and information on impact.

Although there are common characteristics, there are also unique tendencies in each country. *Colombia* has gained important experience in local management. Capacity building is more developed in Colombia than in other countries; nevertheless, it is significantly less developed in small cities and rural areas than in large and medium-sized cities. *Peru* places more emphasis than the other two countries on the development of capacities to respond to emergencies. *Nicaragua* concentrates more efforts than Peru and Colombia on pilot areas of projects and specific programs and on international cooperation in coordination with the National System, where the topic of risk management is becoming more visible.

In *the Philippines*, the range of capacities is similar to that found in Latin American countries. In the framework of the National Disaster Management System, there are Disaster Coordinating Councils at the local level, with well-trained and equipped personnel in some areas. Nevertheless, the focus of these councils is clearly on preparedness and in only some cases can they count on the participation of large parts of society. There is greater capacity in the central regions of the country, while there is none in the south and in remote areas. In some zones, there has been considerable progress towards a broader focus integrating risk management into aspects of sustainable development planning and involving actors of different sectors. Nevertheless, also these localities lack knowledge, own funds, and the capacity to apply preventative regulations (e.g. building codes) prepared at the national level.

The situation is substantially different in *Switzerland* due to the traditional decentralization of the government, with strong autonomy in the cantons and municipalities. A culture of prevention internalized by local actors allows risk management with a very high degree of self-responsibility. To achieve this objective, it was necessary to build up the following capacities: knowledge and analysis of risks, comprehensive planning, preparation and application of regulations (construction, environmental), prevention measures, mitigation and preparedness for emergency response. These capacities are supported by a highly effective national regulatory framework, which also defines clearly the various responsibilities. Given that this system has demonstrated its general efficiency, its reinforcement is concentrated on continuous and widespread promotion of these capacities, the generation of new knowledge related to changes in the risk profile (e.g. climate change), and partial reforms in accordance with detected weaknesses.

Methods and sources of technical assistance

In the five countries selected, a great variety of technical assistance initiatives were observed (Table 4⁹).

⁹ A more detailed table is found in the working paper on capacity building, Annex 2 at the GTZ-website (see note 1, p. 2).

Table 4: Technical assistance (TA) in the five selected countries

Source of technical assistance	Method of technical assistance	Capacity strengthened	Local actors that receive TA
COLOMBIA			
National and regional committees and offices of the System; sectoral agencies; technical and research institutes; universities; emergency response organizations.	Generation and dissemination of information; awareness raising; training; education; preparation of materials; advisory services; dissemination of methodologies.	Information and risk management (risk analysis); planning; preparedness and emergency response; sectoral and technical knowledge; preparation and dissemination of regulations; zoning; vigilance warnings.	Governments and local offices of the System and local agencies; technical staff of municipalities; local professionals of the sectors; local committees and members of response agencies.
NICARAGUA			
Government agencies of the National System; national NGOs; international cooperation organizations (government and non-governmental).	Awareness raising; university training; simulations; publications; training; production of materials; advisory services and studies.	Risk analysis; local organization; civil society participation; focus on risk management; planning and operative plans.	Mayors and assistant mayors; professionals and technical staff of the municipality; members of the Municipal Council; municipal leaders; local population.
PERU			
Civil defense agencies; national and international NGOs; network of actors.	Awareness raising; simulations; dissemination of information; training; advisory services; exchange of information and experiences.	Preparedness and response to emergencies; community organization; risk analysis; risk management know-how; practical applications for the formulation of contingency plans.	District, provincial, and regional Civil Defense Committee; population; municipal organizations and local governments; sectors; public and private institutions that work in planning and local development; the media.
SUIZA			
Civil defense agencies; technical and academic institutes; network of actors; insurers.	Training; generation, dissemination, and exchange of information and experiences; formal education; awareness raising.	Preparedness and response to emergencies; risk analysis; sectoral and technical knowledge; comprehensive planning; preparation and application of regulations and preventative measures; mitigation and reconstruction; knowledge of risks and their management.	Local Civil Defense; local administration and government; local public and private agencies; technical personnel of different sectors; local population; tourists.
THE PHILIPPINES			

National and regional Disaster Coordination Councils; NGOs; Civil Defense Office.	Training; awareness raising; advisory services; generation and dissemination of information.	Preparedness and response to emergencies, including participatory planning; community organizing; risk analysis; information on risks, actors, and available resources.	Local Emergency Councils; private actors; the population; municipal organizations and local governments; sectors.
---	--	---	---

In all of the countries, with the exception of Switzerland, the resources and the coordination between efforts are still deficient. Above all, it is difficult to reach the rural areas, where technical assistance is only occasionally offered, primarily by NGOs. Peru and the Philippines are still focused on emergency response, while the focus in the other countries is more comprehensive and multi-sectoral. In Switzerland and Colombia, assistance is more institutionalized than in the other three countries. Nicaragua is characterized by a high level of international participation.

Strengths and weaknesses of technical assistance practices

This chapter presents several very different technical assistance practices, with their respective strengths and weaknesses. It analyzes the example of a municipality that has achieved a relatively high level of capacity, a pilot project to establish a technical assistance strategy through a national system, an inter-institutional network at the sub-national level, and a novel practice to sustainably increase the awareness of the population with the support of the private sector.

The Local System for Prevention and Response to Disasters of Manizales, Colombia

The following is an analysis of the experience of the Local System for Prevention and Response to Disasters of Manizales, a central region of western *Colombia*.

The Municipal Office for Prevention and Response to Disasters (OMPAD) is responsible for the implementation of plans, programs, and actions to manage risk. In addition, the Local Committee for Disaster Prevention, Response, and Recuperation (COLPADE) is the agency of the National System responsible to plan, program, and implement all the activities aimed at preventing disasters or mitigating their effects when they occur. COLPADE is made up of officials from planning, health, education, and public works, Civil Defense, the National Police, OMPAD, and firefighters; it carries out activities in this area in conjunction with other sectors such as environment, scientific-technical development, information and communications, public services, NGOs, the community, and the private sector. The municipality has funds to carry out activities or to contract other actors such as technical institutes and NGOs.

Through the development of this multi-sectoral system, the following *achievements* (among others) were identified: preparation of maps of hazards and risks; creation of a Seismological Observatory; seismic micro-zoning study of the city; an earthquake-resistant construction code; studies of the vulnerability of several buildings; emergency plan for the city; implementation of housing relocation programs; signalization and evacuation plans; awareness-raising campaigns; and information for the population on risks and their impacts.

The *difficulties* observed are related to deficiencies in coordination; lack of updated maps of risks and hazards; lack of preventative relocation plans; and difficulties with the regulations for the introduction of obligatory insurance against natural hazards.

Local capacities are strengthened in different ways: the operative corps are trained by their respective organizations or through training agreements signed between them (Civil Defense, National Health System, National Firefighting System, Red Cross, National Police, among others). In

Manizales, the Research Institute on Geosciences, Mining, and Chemistry (INGEOMINAS) regularly offers training to these organizations. The administrators receive training from the Colombian Federation of Municipalities, the monitoring organizations, and other agencies dedicated to this task, in which it is crucial to offer training on the existing legislation that affects the municipal level and on other sectoral and thematic aspects such as systems of organization and municipal and departmental financial management. Currently, an agreement is being prepared between the General Directorate for Disaster Prevention and Management (DGPAD) and the *Escuela Superior de Administración Pública* (University of Public Administration) under which the latter will offer training in this area in all regions of the country.

The administrators and technical staff receive training from national agencies such as DGPAD and the Autonomous Regional Corporations that belong to the environmental sector. The Municipal Secretariats for Education, in conjunction with the Local Committees, offer training on the Student Preparedness Plan. The National Training Service (SENA) gives courses on earthquake-resistant construction systems, and the Ministry of Communications has begun to train amateur radio operators so they can collaborate in cases of emergency. In the local and regional context, the universities are important training actors (Manizales and Bogotá).

The project “Supporting Local Risk Management in Six Municipalities in Nicaragua”

In *Nicaragua* the project “Supporting Local Risk Management in Six Municipalities in Nicaragua” has been carried out by the National System for Prevention, Mitigation, and Response to Disasters (SNPMAD) and the United Nations Development Program (UNDP). The project, implemented in 2001 and 2002 in the municipalities of Dipilto, Mozonte, Ocotal, San Isidro, Sébaco, and Ciudad Darío, focused its activities on five aspects of comprehensive risk management: awareness raising (workshops), organization (meetings), risk analysis (self-mapping and indicative evaluation of risks and local resources), planning (municipal development strategies), and systematization of experiences (written documentation).

Although the term of the project was one year, several *achievements* could be identified: knowledge and awareness of vulnerabilities and risks and their connections to sustainable development; promotion of preventative attitudes; clarification of the roles and functions of local actors, especially of the municipal administration, in order to integrate risk management into local development; strengthened civil society participation (e.g. through risk analysis); strengthened role of local authorities through risk management instruments (including risk analysis as the basis of strategic municipal planning); coordination between local actors and exchange of experiences with other municipalities.

Some of the *capacities acquired* by local actors (municipal authorities and technical staff, community leaders, sectoral representatives of government institutions, national and international NGOs, technical staff of SNPMAD) through the project are: increased knowledge of the hazards, conditions of vulnerability, and risks of each of the localities; familiarity with Law 337 and the role of local actors to reduce risks; preparation of diagnoses of local capacities and resources, as inputs into municipal planning with a focus on risk reduction; preparation of risk scenarios through the use of tools such as the indicative map of risks; preparation of the municipal planning strategy with a focus on risk reduction. Nevertheless, these capacities must be strengthened through technical advisory services with long-term backup (above all, familiarity with the risks and the responsibilities of those involved, as well as the participation and permanent coordination of local actors). Among the actors mentioned in connection with this support are: INETER, INIFOM, AMUNIC, SDC.

The Disaster Risk Management Group of the Department of Piura (GGRD), Peru

After the 1997-98 El Niño, a Disaster Risk Management Group was formed in the department of Piura, an initiative promoted by professionals who were interested in the topic of risk management,

and were working in the region of Piura on behalf of different public and private institutions of the region. Their principal activities involve:

- Formulating adequate technical proposals for risk management in the region.
- Advising sectoral teams on the topic of risk management.
- Promoting spaces for reflection on existing risks in order to improve decision-making.
- Promoting a focus on risk management in the institutions.
- Strengthening multi-disciplinary teams of professionals in the region who are familiar with and apply risk management topics.
- Promoting specific projects to diminish risks in the river basins.
- Promoting processes to raise the awareness of authorities in order to implement activities to reduce risk from the El Niño phenomenon.

In an evaluation meeting that took place in January 2003, the GGRD listed the following strengths and weaknesses of its activities:

Strengths: promotion of proposals to incorporate risk management in the region; recognition as a regional voice on the topic; promotion of a high degree of awareness among the population of the topic of risk management; promotion of instructor training and, at the same time, the generation of spaces for analysis of the topic of disaster risk; maintenance of discussion forums that influence decision-making at the institutional level; promotion of concerted efforts to develop training activities for actors of the regional and provincial level; and the participation of institutions with extensive knowledge of risk management, which improves learning by participants.

Weaknesses: little participation by some institutions in the daily development of activities; little integration of other civil society institutions of the department; little dissemination of information about GGRD activities in national and provincial-district media; little incorporation of local government representatives (e.g. the province of Piura); and no formal recognition of GGRD.

Raising awareness through “protection.forests.people” learning trails, Switzerland

Since 2002, eight "protection.forests.people" learning trails that permit one to experience natural hazards and protection forest have been organized in the mountainous regions of Switzerland. The objective of the learning trails is to raise the awareness of the local population and tourists with respect to the importance of the forest as protection against natural elements in areas threatened by hazards such as rock slides, flooded rivers, detritic rock slides, landslides, or avalanches. In the areas where the destructive forces can be observed, the trails aim to convincingly demonstrate the preventive protection offered by the forest expanses. In designing the trails, special emphasis was placed on sustainable learning. The installations (some of which can be set into motion) and the "interactive" boards especially designed for the trails provide vivid access to the principal aspects of the relationship between people and protection forests. With stimuli for individual activity, questions that awaken interest, and the possibility to converse in a group, the transmission of the information is part of an animated and moving process.

Project “protection.forests.people” is financed by a consortium of 22 Swiss insurers. This project that benefits populations threatened by natural hazards, the only one of its kind in the world, begins with the conviction that the protection forest is enormously important for the prevention of damage. Thanks to this consortium, it is possible to obtain insurance against damage caused by natural elements, with a single premium acceptable to all those insured.

Planning and constructing the trails is the responsibility of the environmental education organization, SILVIVA, which is present throughout the country and is specialized on the topic of “forests and society.” Quality management of the project is in the hands of the Group for Public Relations,

Forests, and Natural Hazards (GOWN), which is comprised of forestry authorities of the Swiss Confederation and some cantons, as well as the Swiss Forestry Association.

CONCLUSIONS FOR A TECHNICAL ASSISTANCE STRATEGY

Need for a national assistance strategy

Although there has been conceptual progress towards a comprehensive focus on risk management in Latin America and the Caribbean, in large parts of the region, the capacities and their strengthening at the local level continue to be concentrated on preparedness and emergency response. There is still little integration of risk management into the daily life and work of the organizations and the population in general and few ties to development processes.

There is greater capacity in urban areas than in rural zones, with the exception of those areas served by a particular technical assistance pilot project or program. Very different actors contribute to local capacity building, but in most countries these initiatives are not coordinated and are frequently isolated. The existence of a national risk management system is a good basis from which to promote coordination mechanisms.

This analysis shows that the establishment of a national technical assistance strategy makes an important contribution, by strengthening local capacities to comprehensive and sustainable risk management by local actors in the national context. Such a strategy provides:

- Systematic strengthening of capacities in all localities at risk (*quality and coverage*)
- Coordination and thus better use of available skills, know-how, and resources to strengthen local capacities
- Assurances that technical assistance is consistent with national risk management policy.

Establishment of the strategy requires favorable conditions at the national level, exact knowledge of the existing actors, and identification of the required capacities in the different localities of the country. This analysis allows one to identify the areas that require strengthening and the methods and sources of adequate technical assistance.

National context

The capacities required at the local level, like the actors that can provide technical assistance, are connected to the institutional and regulatory frameworks of the countries (decentralization, level of municipal autonomy, distribution of functions among sectors, laws favoring risk management, etc.). Different legal and institutional frameworks may lead to different distributions of functions and capacities; nevertheless, in many cases it will be necessary to change the laws or decentralize the functions to facilitate effective risk management. The analysis of the countries studied has shown that the countries with a greater degree of institutionalization in this area, decentralized structures (including own funds at the local level), and a comprehensive focus, have developed a greater and broader level of local capacity for risk management. Similarly, the localities with greater autonomy (including own funds), higher degree of organization, and a comprehensive focus have made more progress in managing their risks.

Therefore, in order to create favorable conditions at the national level for adequate risk management, the following is recommended:

- Seek to establish *consistent and decentralized institutions* for risk management, granting local governments autonomy and responsibilities for risk management within their territory, including access to the technical assistance and financial resources (see Section V) required for them to be able to carry out their functions.

- Promote a *comprehensive focus* through regulations favoring development, taking into account the risks, the factors that generate risk, and the possibilities to reduce risk. In addition, with the same objective, seek the involvement of actors of different sectors of the society in risk management, with clear definition of responsibilities and functions. It is therefore advisable to validate and publicize multiple sectoral activities that – although not evident – are addressing the primary causes of risk (e.g. poverty reduction plans or production diversification programs).
- Promote the *preparation of follow-up and measurement indicators or mechanisms* that facilitate the identification of the real impact of the sectoral or regional development processes and interventions on the conditions of vulnerability (see Section IV). Document and follow up the successful experiences of risk reduction.
- Create conditions for *civil society to participate* in the reduction of the processes that generate risk.

Local actors

For comprehensive risk management, it is crucial to involve a broad range of local actors, who have demonstrated their potential in a great variety of municipalities and communities:

- Local government and administration;
- The population, community leaders and organizations;
- Local representatives of different sectors, both the public administration (e.g. health, education, transport, environment, public works) and the private sector (technical and education institutes, firms, non-governmental organizations, the media, etc.);
- Emergency response organizations (emergency committees, firefighters, Red Cross, brigades, NGOs, etc.) and NGOs specialized in reconstruction and/or risk reduction activities.

Each actor has different capacities, functions, and responsibilities. The essential thing will be to coordinate them well in order to achieve effective and comprehensive management of the risks of the zone. The form of coordination and distribution of functions depends particularly on the national legal and institutional framework (municipal department responsible for risk management, multi-sectoral committee coordinated by the mayor, with thematic sub-committees, etc.) This framework influences, among other factors, the degree of participation of different civil society actors in risk management.

Sometimes it is difficult to motivate local actors to actively participate in risk management. A combination of awareness raising measures, continuous involvement of the actors, monitoring fulfillment of responsibilities (by civil society or one institution), incentives, and monitoring and evaluation mechanisms helps to increase interest. Given the fact that the resources in the majority of the localities will not be sufficient to address all the needs in the region, it is very important for the actors to have appropriate decision-making mechanisms in order to use the limited resources for the measures perceived to have priority.

One very important aspect is the relationship between, on the one hand, the efforts of prevention, mitigation, and sustainable development under conditions of risk and, on the other hand, the agencies charged with responding to emergencies, generally coordinated in emergency committees. Although at first glance they appear to have different areas of work and arenas for action, direct cooperation is very important, for example, for risk analysis, preparation of the community, and evaluation of damage. For this reason, mechanisms of exchange and coordination of functions, also in “normal” times, are required.¹⁰

¹⁰ In this context, it is interesting that the actors who function in “normal” times more effectively, also respond to and manage an extreme event or a disaster that has occurred in a more effective manner (Maskrey 1997).

Capacities required at the local level

The capacities required depend on the existing actors and their functions and possibilities, in addition to the risk profile (hazards and vulnerabilities) of the zone and the national context. A national strategy must take into account the differences between regions and localities and adapt technical assistance to these realities. Nevertheless, based on the principles of a decentralized and multi-sectoral focus, the experiences analyzed permit a general determination of the most relevant capacities required at the local level (Table 5).

All relevant actors must have basic knowledge of the risks and their reduction. This includes knowledge of the other actors involved and the legal context. All actors need the capacity to acquire the information and resources required to reduce their risks and the ability to adequately implement measures, either individually or in an organized fashion, as need dictates. The capacity to communicate and coordinate is fundamental for all; permanent functional mechanisms must therefore be promoted. In the case that a responsibility exceeds their own capacities, the actors must know how to acquire and monitor the required assistance (e.g. training, advisory services).

The impact of local risk management basically depends on the role assigned to and assumed by the municipal or community *government and administration*. These must, to the extent that they are able, coordinate or at least accompany the entire process at the local level, ensuring the consistency of risk management with the other elements of sustainable local development. They therefore need the capacity for regional planning, local development, and management of processes that include monitoring and evaluation mechanisms, as well as the capacity for organization and management of personnel, material, and financial resources. To these capacities must be added the ability to coordinate and/or involve the remaining local actors, which requires that the governments apply a participatory focus and have the capacity to distribute and coordinate functions.

The profile of the capacities required of the *population* results basically from the need to adapt the conditions of daily life to risk (e.g. agricultural production, drainage, housing construction), to organize in order to undertake or request prevention and mitigation measures beyond the reach of the individual (e.g. management of drinking water, drainage systems, dams), and to increase their preparedness capacity (early warning, evacuation and shelter, rescue and evaluation of damage). This requires a preventative attitude, knowledge, the capacity for community planning and organization, and the ability to influence processes managed by other actors.

Table 5: Local capacities required to manage risks and most relevant local actors who should be strengthened

Knowledge required
Basic knowledge of the factors that generate risks and the elements and instruments to manage them (actors: <i>everyone</i>).
Instruments for risk analysis (actors: <i>technical staff of the municipalities, risk management committee</i>).
Knowledge of the actors involved and the regulatory framework (actors: <i>responsible agency, government</i>).
Specific knowledge, depending on the concrete risks and measures that should be undertaken to prevent, mitigate, and prepare for them (actors: <i>everyone, as they are able - responsible agency, sectors, the population</i>).
Instruments to evaluate the damage (actors: <i>responsible agency</i>).
Managing the processes at the local level

Development planning, projects, proposals, spatial planning, etc. (actors: *local administration*).

Generation and management of personnel, material, and financial resources. Access to and management of information (actors: *everyone, as required*).

Implementation of individual measures (e.g. insurance, earthquake-resistant building construction) or organized measures (actors: *everyone, as required and able*).

Establishment of communication and coordination mechanisms (actors: *responsible agency, government*).

Development of a participatory focus with directive and decision-making mechanisms (actors: *government*).

Elicitation of support and provision of follow-up, including the hiring of other actors (actors: *everyone, as required*).

Application of monitoring and evaluation mechanisms. Follow-up of activities carried out. Systemization of experiences (actors: *responsible agency, local government, sectors*).

Consistent integration of risk management into development processes: regional development planning (actors: *local administration*), integration of the topic as a cross cutting theme into sectoral policies (actors: *sectors*). Adaptation of daily life and housing to the conditions of risk (actors: *the population*).

Influence on the processes managed by other actors; participation in and contribution to the implementation of risk management measures (actors: *everyone, as required and able*).

Creation (e.g. municipal ordinances) and application of regulations (actors: *local administration*).

Integration into the national context

Mechanisms of communication and coordination with actors of the departmental, regional, and national levels (actors: *local government, sectors*).

Elicitation and monitoring of external support (actors: *local administration*).

Exchange of information with actors of other localities (actors: *local government*).

Influence on processes managed by external actors (actors: *local government, sectors*).

The *local representatives of the various sectors* of the public administration (education, health, management of drinking water, public works, the police, etc.) and of the private sector (firms, financial sector, etc.) should integrate local risks into their daily activities (preparations, adequately adapted construction of the infrastructure) and contribute, according to their functions and capacities, to concrete risk management measures.

The local *civil protection* structures have a special responsibility. They require sufficient human, material, and financial resources, as well as knowledge and organizational capacities to ensure adequate preparation of the community and provide effective emergency response, in coordination with the other actors.

In many communities there are *non-governmental organizations (NGOs)* that are specialized in various aspects of development (community participation, micro-credits, environmental protection, etc.) or also in response to and reconstruction after disasters. These may significantly contribute to risk management through their knowledge, their close ties to the population, and their capacity to organize financial resources (Benson, Twigg and Myers 2001). To this end, they need the capacity to integrate the topic into their daily work. Furthermore, they can assume – in coordination with the other actors – specific functions such as management of natural resources, risk analysis, awareness raising, organization or preparation of the population.

Finally, it should be mentioned that the local *media* can play an important role in informing (including alerting) and raising the awareness of the population. They must therefore be familiar with the composition of the risks and the possibilities of reducing them, the actors and efforts to manage risk in their municipality and community, and the pedagogical means of favorably influencing these processes before, during or after a disaster.

Methods to strengthen local capacities

The technical assistance methods oriented to strengthening local capacities that were identified in this study are: formal education (school, university, and vocational education); training courses and workshops, including preparation of didactic material; occasional advisory services (e.g. for the formulation of regulations) or advisory services for processes (e.g. of community organization or organization of local committees); awareness-raising campaigns; dissemination and exchange of information, instruments, and experiences; promotion of individual measures (e.g. insurance) and incentives; and the active involvement of actors in activities and processes. The most appropriate methods to use depend on the counterparts (that is, on the agents that require and those that offer capacity building) and on the objective that is pursued. Generally, the methods can be differentiated according to three objectives:

- To *promote the participation and coordination* of the relevant actors, the first thing that is required are activities to raise awareness (e.g. campaigns in the media, signs, meetings, training, visits to risk zones). In addition, it is recommendable to involve the actors participating in the processes (e.g. invitation by municipal governments to participate in the establishment of a regional development plan) and in concrete activities (e.g. preparation of risk maps or simulations), to support community organization (including local committees) through training, advisory services, and the introduction of instruments (management, monitoring and evaluation, etc.), and to promote incentives and individual preventative measures, as well as the exchange of information on experiences.
 - For *knowledge transfer*, use is made of formal education (school, university, and vocational education), awareness-raising campaigns, training (including for multipliers), as well as dissemination and exchange of information and experiences.
 - *Specialized technical support*, through advisory services and the dissemination of information.
- Most of the methods can be applied permanently or for a particular activity.

A lesson learned has been that isolated training or awareness-raising campaigns have no significant impact; instead, for sustainable capacity building, it is recommended that local actors be continuously involved in risk management activities and the consideration of risk in their daily life and work. This recommendation also applies to the local administration (integration of the topic into development plans, etc.), sectoral institutions, and the general population. Capacity building is a long process, closely linked to profound understanding of the causes and consequences of the risks and a responsible willingness to contribute to their reduction.

Sources of technical assistance

The sources of technical assistance that were identified are found at five levels:

- *Internal strengthening of local actors*: the possibilities are more extensive in large cities where there are technical institutes, universities, and firms with greater capacity and resources. But also in the rural areas, there are examples of community organization by a local NGO or preparedness for emergencies by local technical civil defense personnel.
- *Strengthening actors of different localities in a bilateral or regional manner (e.g. water catchment areas) or through municipal networks*: local actors of other municipalities can offer training and advisory services in areas where they have advanced knowledge, expertise, or experience. The micro-regions and the municipal associations are important for horizontal technical assistance and joint activities.
- *Support of institutions, organizations, national and sub-national networks*: at the national (and perhaps at the departmental or regional) level, one finds a broad range of actors who participate in or could contribute to local capacity building. First of all, the *universities and other educational institutions* that offer training for technical personnel and professionals in different areas: teacher training (through the integration of the topic into curriculum plans), architects and engineers (instruction in construction that is earthquake-resistant and adapted to the risk of flooding, construction of mitigation works) and agricultural engineers (instruction in agriculture adapted to

sustainable management of natural resources). In addition, they offer programs and special courses on the topic.

The *institutions and organizations of the different sectors* (public and private) should ensure that their local personnel are adequately trained. In addition, they can offer training and specialized advisory consultancies.

In all the countries, there are *research and technical institutions* that produce information related to risks (hazards and vulnerabilities). It is important that they collaborate in the determination of possible risk reduction measures and in disseminating the information produced. Furthermore, they can offer training on accessing and using the available information and specialized consultancies.

Finally, the *media and information centers* can organize or participate in awareness-raising campaigns for children and adults and involve themselves in the dissemination of information.

- *Advisory services provided by regional actors and networks*: the role of regional organizations and networks is particularly interesting for neighboring countries with a similar risk profile (e.g. CEPREDENAC, CDERA, PREANDINO, La Red, etc.). Regional cooperation facilitates the generation and exchange of information, experiences, and technical assistance. Furthermore, regional agencies can offer advisory services in areas where there is no national capacity or where it appears more efficient to concentrate technical assistance at this level.

- *Advisory services offered by international actors*: technical assistance offered by international actors for local capacity building has two aspects: if the national, departmental, or local actors do not have even the possibility of strengthening capacities, the international actors can offer support, contributing knowledge, instruments, and resources (e.g. OFDA, ISDR, ECHO, UNDP, bilateral cooperation). Nevertheless, this type of technical assistance should be reduced as the national technical assistance system is strengthened.

The second aspect concerns highly specialized knowledge. Here institutes, such as the Global Fire Monitoring Center in Germany, offer information, consultancy services, and training in all parts of the world. It is not necessary for all countries to have such specialized institutes if they have access, when necessary, to the support provided by these global institutes.

In search of greater development of local capacities, their sustainability and adaptation to local realities, it is relevant to underline the importance of the principle of subsidiarity for technical assistance. Nevertheless, for highly specialized topics, it may be much more efficient to turn to occasional assistance by national or international technical institutes rather than create own capacities at the level of each locality. In the case of rural or low-risks zones, it may be appropriate to concentrate capacities at the sub-national level (e.g. department or micro-region).

Recommendations for the implementation of the strategy

It is necessary to designate, first of all, a national agency responsible for the preparation, implementation, and follow-up of a technical assistance strategy. It should be a public agency, closely tied to the national risk management structures (e.g. Executive Secretariat or Technical Secretariat of the National System, a multi-sectoral committee).

For the implementation of this strategy, the following recommendations are offered:

- Integrate technical assistance into the national risk management system (focus, policies, institutional and legal framework).
- Clearly define the functions and responsibilities (coordination, planning, implementation, monitoring, etc.) of the national actors involved in providing technical assistance to local actors.
- Differentiate between general guidelines for technical assistance offered by the national level and the autonomy of the local actors to define contents, methods, and sources of complementary technical assistance (subsidiarity).
- Determine the technical assistance required on the basis of demand, that is, the local risk profile, the actors and available local capacities, and the national context.
- Due to the scarcity of resources, it is necessary to define criteria for the prioritization of technical assistance efforts. This prioritization will depend on the specific realities of the country (risk, actors,

and existing capacities). Nevertheless, as a basis for more specific measures, we recommend prioritizing awareness raising, acquisition of knowledge, and broad dissemination of information on risks and their management. Another priority is organization and coordination of the actors relevant to the local level and their integration into the national system.

FINANCES

INTRODUCTION

Financing disaster risk management in Latin America has become a critical issue in view of the mounting cost of disasters. According to the Centre for Research on the Epidemiology and Disasters, between 1990 and 1999, losses in the region reached \$30.5 billion or \$3 billion a year (Charvériat 2000). On the other hand, public finances have been constrained in many ways. The external debt burden of the region has expanded steadily throughout the 1990s, from less than US\$ 500 billion to over US\$ 800 billion by the end of the decade. The official development assistance received by Latin America has also shown a downward trend. The region received US\$ 5 billion, which is equivalent to 12 percent of gross bilateral assistance, and no Latin American or Caribbean country figured among the 10 principal recipients (ECLAC and UNDP 2002). Though private international financial flows have increased, its high cost and volatility have ruled out its availability for disaster risk management.

The financial study draws upon three case studies based on Colombia and Bolivia from Latin America, and Germany from Europe. The last country has been included to provide a developed country perspective to the study. The study is organized in five sections. In the first section, the study looks at the context, rationale, and approach to the study. In the second section, we look at the scheme of decentralization that has evolved in Latin America, with special reference to the countries included as case studies, and its implications for disaster risk management. In the third section, it discusses different channels of fiscal and financial arrangements and the actual commitment of resources for disaster risk management in these countries, based on the case studies prepared by national consultants. The fourth section looks at the availability of financial instruments and services for disaster risk management at local level. The fifth and final section presents conclusions and recommendations.

“Local government” is a term that covers a wide range of functioning entities. There are 14,000 municipalities in the Latin American region, which include cities with more than 10 million, and villages with 200 inhabitants, densely populated urban and rural areas, and sparsely populated territories-- all are, as a rule, governed through one or the other form of a local government (Bird 2000).

It is necessary to recognize the diversity and heterogeneity of local governments and their resources. Local governments and communities need to be supported on the basis of an assessment of vulnerabilities and capacities they are exposed to. An appropriate financing strategy for disaster risk management is therefore linked to risk assessment, economic resources, and exercise of public choice at the local level.

The study addresses a number of issues regarding financing of disaster risks situated in the context of political and fiscal decentralization in Latin America: What are the financing and fiscal arrangements for disaster risks at the national, sub-national and local governments? How do local governments raise their resources for disaster risk management? What is the level of dependence of local governments upon national governments for financing of post-disaster recovery and reconstruction? What needs to be done to augment financial resources for disaster risk management at the municipal and community levels? The study also explores the feasibility of financial instruments and services that households and communities can use for the purpose of investing in disaster risk reduction.

Impacts of disasters on local economies

There is a growing tendency to present disaster losses in terms of Gross Domestic Product (GDP). However, with the important exception of widespread drought, natural disasters have not had measurable short-term impacts on national economic aggregates—such as levels of GDP, the balance of payments, or the rate of investment—in geographically larger countries (Benson and Clay 2000). A disaster may have high costs in absolute terms—as was the case of Mexico City earthquake with losses of US\$ 4.1 billion (current value)—but in view of the size of the country's economy, it had relatively modest macroeconomic effects. If a particular region or sector is seriously affected by a disaster, its losses are absorbed by activities in other sectors (Charvériat 2000).

It is in smaller and single crop-based countries, typically the countries in Central American and the Caribbean, where disasters are likely to have greater macroeconomic impact. However, in smaller countries too, the public and private investment in reconstruction may increase the GDP growth rates after the initial losses (Albala-Bertrand 1993). They are diversifying their economies, thus reducing the impact of disasters. The Republic of Dominica is a small economy, dependent on the export of bananas for most of its income. Though its GDP has been affected by adverse weather conditions, the growth of non-agricultural sectors has somewhat compensated these losses (Benson et al. 2001).

A small impact at a macroeconomic level can cause huge damage at the level of cities, towns, and communities. The common experience is that residential property tends to bear the brunt of damage and the urban and community services are damaged too. Transport infrastructure is the most affected, followed by water supply and sewage systems. Generally, those most frequently killed and injured are the urban poor who often lose their homes, many of which are constructed with low quality materials on unstable and disaster-prone land (Albala-Bertrand 2002). The role of local government becomes critical in dealing with these local-level impacts.

Financing of disaster risk at the local level becomes even more critical in view of lower national expenditures on social security and disaster-related functions in Latin America. Whereas the industrial countries spend over 16 percent of GDP, and over a third of public sector spending on social security, Latin America spends only 2.5 percent, or less than 10 percent of total spending. Further, Latin America also spends much less than the industrial economies on “core” government functions. Disaster risk management could be included in the “core functions”, as it is generally not classified as an item of public investment.¹¹ While industrial economies spend 25 percent of GDP on core functions, it is only 15 percent for Latin America.

Local governments need to have access to resources in order to provide basic emergency services to the citizens within their jurisdiction. An emergency management capability constitutes the core of local government's functioning. In dealing with disasters, local governments may create geographical focus at the local level by coordinating resources through different sectors. Similarly, community-based mitigation programs, which are planned and implemented at the local level, represent a targeted and cost-effective approach to disaster risk management. The NGOs and professionals could be supported financially for implementing community-based interventions.

The World Bank and Inter-American Development Bank (IDB) has financed a number of post-disaster reconstruction programs in Latin America. Though national governments are more often in charge of these post-disaster programs, many of these components contribute to capacity building at the municipal level. Local governments and institutions have a greater role to play in reducing disaster risks.

¹¹ Public investment includes only capital spending.

All the developed countries invest a great deal in risk reduction through improved construction standards, better land use, and emergency preparedness. The United States invested billions of dollars in satellites, radars, surface observing networks, and information processing to modernize their ability to observe, forecast, and provide warnings of hydro-meteorological hazards. What distinguishes a developed from a developing country is basically the level of investment in preparedness and mitigation, and not really the role of insurance.

Even a modest investment in preparedness and mitigation programs at the national and local levels on a consistent basis can bring substantial reduction in disaster losses. Further, without making it an argument for a government dole, it is necessary to underscore the government's moral responsibility to act as a catalyst and facilitator in peoples' efforts at recovery and reconstruction. Asking people to depend exclusively upon insurance payments or other market-based resources in a post-disaster situation is neither reasonable nor politically feasible.

In this study, we propose a more broad-based approach. Risk management mechanisms could be based either on social networks, or driven through market forces or provided through governments. Diverse strategies and multiple mechanisms are important, as they provide depth of resources and greater resilience. These mechanisms bring together a range of instruments and services: exchange of gifts, self-insurance through savings, financial intermediaries and insurance, and publicly provided social insurance programs for old age, disability, and unemployment (Lustig 2001). The approach to risk management at the local level must recognize the diversity of these arrangements and their appropriateness for different groups.

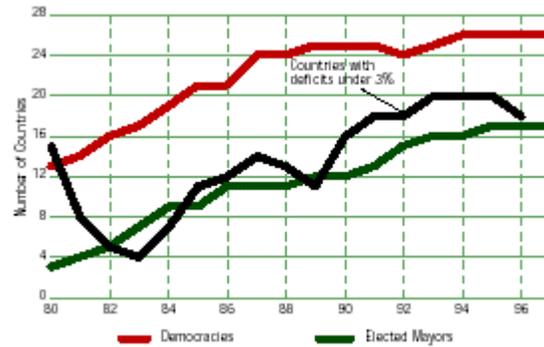
STATE DECENTRALIZATION: ITS SCOPE AND DINAMICS

Since the early 1980s, the growing trends of democratization and decentralization in Latin American countries have significantly strengthened local governments in terms of planning, decision-making and spending. Large federated systems and unitary governments alike approved constitutional reforms, passed major laws, and even adopted new constitutions (in Brazil and Colombia) that conferred substantial powers and authority upon local governments (Campbell, et.al, 1991). While only three countries in the region elected their mayors directly in 1980, 17 countries today use this form of local representation, while in six others mayors are appointed by elected municipal councils (IDB 1997).

Decentralization is making its presence felt in many other sectors, which are related to disaster management (Vries et al. 2001). In the forestry sector, there is a dynamic transition underway whereby public forests are being transferred or assigned to local governments, or indigenous and non-indigenous communities. Similar experimentation has been initiated in a number of other sectors such as water and irrigation systems, fisheries and coastal resources, facilitating greater access to local communities vis-à-vis large-scale commercial enterprises, and devolving allocation and environmental regulatory function to local governments and their residents (World Bank 2001)

In the area of urban environment, a number of cities in Latin America have started environmental management actions to tackle problems in their own jurisdiction. They have set up environmental agencies or departments for devising environmental policies and coordinating their implementation. A number of initiatives have been taken in the area of sewerage, solid waste management and pollution management (Vries et al. 2001).

Graph 1: Democratic Governments, Elected Mayors, and Countries with Low Fiscal Deficit



Source: IDB, 1997

Political Decentralization in Colombia, Bolivia and Germany

As regards the countries included as case studies in this study, **Colombia's** decentralization began in 1983 with the decision to strengthen sub-national sources of revenue and to grant sub-national governments more discretionary authority on tax rates and overall tax administration. In 1986, the process was reinforced with the decision to permit the direct election of mayors and transfer of significant revenues and responsibilities to municipalities. A new constitution of 1991 authorized the direct election of provincial governors. Colombia is currently divided into 32 departments and 1,098 municipalities. There are considerable differences among them as far as size, population, income and economic activities are concerned. This influences their fiscal and administrative capacity to manage certain public goods and services (Burki, et al. 1999).

In **Bolivia**, the most comprehensive package of decentralization legislation, known as the Ley de Participación Popular (LPP), was passed in 1994. The law heralded a new era of municipal government for the overwhelming majority of Bolivian towns and cities. One-hundred ninety-eight new municipalities – 64 percent of the total – were created, and existing ones were expanded to include suburbs and surrounding rural areas, to the point where the 311 municipalities exhaustively comprise the entire national territory. In addition to changing the physical jurisdictions of the country, the LPP granted real powers to municipalities, allowing the public election of municipal officials – a municipal council and mayor – and granting substantial transfers of central government funds to the new governments (Burki, et al, 1999, Faguet, 2000). Municipalities are now responsible for the provision of education through the secondary level and virtually all health services. They have also been assigned responsibility for micro-irrigation, local roads, culture and sports (Mackenzie and Ruiz 1997).

Germany, which is included as a case study from outside Latin America, has a well-established democratic federal set up. The administration is conducted at three levels: (1) the Federation, which deals with issues of national importance, such as defense, foreign policy, foreign trade, rail and air transport, posts and communication; (2) the Laender i.e. intermediate federal authorities responsible for education, police, culture, etc. and (3) the municipalities, i.e. the lower federal authorities responsible for the local level.

Fiscal Decentralization

Local governments have access to different sources of local revenue—user charges, taxes, transfers, and loans. Different kinds of revenue have different impacts on behavior and different patterns of incidence: user charges impose costs on individuals and can thereby ration consumption

by price; benefit taxes can impose costs more broadly on the taxpayers within a jurisdiction, but can only ration through the local political process. Transfers make it possible to move money across jurisdictions, enabling central government to influence the behavior of local government and to redistribute income between constituents of different local jurisdictions. Local governments also raise loans through financial markets and multilateral agencies, with strong fiscal implications for the national economy (Dillinger, 1994).

Fiscal decentralization and the consequent intergovernmental transfer in Latin America resulted into an increased access to financial resources for the state and local governments. In Brazil, the 1988 constitutional changes cut approximately six percentage points from the central government's share of the final retention of public-sector revenues. These revenues were reassigned to state and local authorities. In Venezuela, decentralization legislation increased states' share of centrally collected ordinary revenues from 15 percent to 20 percent over a five-year period ending in 1995. Local governments from Guatemala to Argentina have been spending 10 to 40 percent of total public spending amounting to significant fractions of GDP (Peterson 1997; Campbell 1997).

In **Colombia**, in the year 2001, the Constitution created a National Participation System consisting of a fixed amount of close to 50 percent of the national income (in this year's pesos, the amount was nearly 11 billion, or about US\$ 4,000 million). The National Participation System is regulated by Law 715 of 2001, which divides the funds transferred into three large shares: a. the share for education representing 58.5 percent of resources; b. the share for health representing 24.5 percent; and c. the share for general purposes representing 17 percent. Disaster management is one among many components, which are included in the general-purpose expenditure. A highly earmarked fiscal system, however, reduces the discretion in the use of funds.

In **Bolivia**, municipalities were given exclusive authority to impose vehicle and property tax. The element of fiscal equalization among municipalities was introduced through the stipulation that 20 percent of the central budget was to be divided among the municipalities based purely on each municipality's share of the population, as established by 1992 census. Total resources devolved from central to local governments increased by 72 percent. Smaller and poorer municipalities were major beneficiaries of the new system, while the larger cities listed saw more modest gains, and only La Paz suffered a net reduction in transfers, itself a sign of how disproportionately it benefited under the old system. As a result of decentralization, participatory organizations grew dramatically during the initial years, and citizens have demonstrated an active interest in local investment planning and monitoring of municipal governments (Burki et al. 1999).

In **Germany** too, the Basic Law lays down a scheme of fiscal federalism, whereby taxation and sharing of revenues between different levels of government are regulated. Major sources of government revenues consist of income tax, corporation tax and value added tax, levied and collected centrally, which are shared out between federal government, states (*Laender*), and municipalities. Other tax revenue accrues directly to the levels of administration, e.g. taxes on gas, cigarettes and alcohol to the federal state, car and inheritance tax to the states, and property and excise tax to the municipalities. Furthermore, an important element of this system is the vertical and horizontal financial equalization at the level of states and municipalities for which tax revenue per capita is used as the metric. Lower levels of governments often execute policies on behalf of higher levels, where financing is sometimes tied to function performed, with corresponding grants or cost restitution (Spahn and Föttinger 1997).

FISCAL AND FINANCIAL ARRANGEMENTS FOR DISASTER RISK MANAGEMENT

The section looks at the fiscal and financing arrangements for disaster risk management in all three countries included in the study: Colombia, Bolivia, and Germany. Though the institutional and public finance context in these countries are diverse, these case studies provide us relevant lessons for developing specific financial services and instruments for disaster risk management. Many aspects of the national and local context of these countries have been presented together under specific themes.

National System of Disaster Risk Management

All three countries have decentralized their national disaster management system in the last decade, assigning specific responsibilities and resources to the sub-national and municipal governments.

In **Colombia**, a new National Disaster Prevention and Management System was set up in 1989, which decentralized disaster-related functions and gave a large role to departments and municipalities. At the apex level is the General Directorate for Disaster Prevention and Management (DGPAD), part of the Ministry of Interior, which functioned with a number of operational and technical committees, drawn from other agencies. The national structure was replicated at department and municipal levels. The role of military in disaster management was radically cut down. Decentralization was further reinforced by Law 715 of 2001, which regulated the distribution of responsibilities and resources among government levels, and assigned functions in the disaster management to local governments, allowing them to channel resources from their general purposes share to disaster prevention and management activities.

In **Bolivia**, the Risk Reduction and Disaster Response Law, enacted in 2000, created the national Risk Reduction, Emergency and Disaster Response System (SISRADE). At the national level, the SISRADE is managed by the National Council for Risk Reduction and Emergency and Disaster Response (CONARADE), the highest decision-making and coordination body, and operates through a national, departmental and municipal network. It has been planned to strengthen the SISRADE and its subsystems of information and finance, with a credit of US\$3 million from the IDB, starting from 2003. The national system works through two agencies: National Civil Defense Service (SENADECI) and National Risk Reduction Service (SENAR).

In **Germany** too, the federal government handed over the executive authority for civil defense to the states (*Laenders*) in 1990 through a revision of earlier 1968 act. States (*Laenders*) are now responsible for the population's protection against natural and technical disasters, and have, therefore, enacted fire protection and disaster management laws. States have also taken steps for flood protection and regulation of flood plains.

Financing for Disaster Risks at National Levels

In **Colombia**, the funds for disaster risk management at the national level are provided through a number of sources. The important sources are: a. National Calamity Fund provided through the national budget, b. budget resources appropriated by different national agencies, c. national and international credit, and d. technical cooperation resources. The national government provides most of its resources through the National Calamity Fund and the credit from multilateral development banks. However, a consolidated information upon the resources available through different mechanisms is not available.

In **Bolivia**, the El Niño-related emergencies provided the context for setting up new financing arrangements at the national level. The Ministry of Finance was asked to channel all the resources for disasters, making allocations from the national budget as well as securing external loans. The government also saw the need to create the Operational Technical Unit for Support and

Strengthening (UTOAF), now called the National Risk Reduction Service (SENAR), for all the emergency works. The UTOAF coordinated closely with the Ministry of Finance and the Social Investment Fund (SIF) for resource allocation and its channelling through Departmental Prefectures. However, the need for greater decentralization led to a revamp of the system as introduced by Law 2140 for the Reduction of Risks and Management of Disasters and/or Emergencies in 2000.

In **Germany**, despite the responsibility of *Laender* and municipalities in respect of disaster protection, it was recognized that the recent floods were beyond the capacity of these political units, and the people expected the federal government to take political and financial responsibility for response and recovery. Though the federal government responded to the floods invoking national solidarity, it also re-emphasized the responsibility for disaster management on local and *Laender* level. As evidenced during the recent floods, disaster risk management in Germany involved a great deal of negotiation over resources and responsibilities at different levels of government.

National Reserve / Calamity Funds

In **Colombia**, the National Calamity Fund was created in 1984 via Decree 1547 and later reorganized via Decree-Law 919 of 1989. The main objective of this Fund is to tackle disaster situations, but it also undertakes prevention and the operation of the Directorate for Disaster Prevention and Management. The fund can be supported with resources from the national budget, the contracting of loans, the placement of public debt titles, investment profits, special quotas from the Bank of the Republic and national and international donations. In reality, the Fund is mainly financed from the national budget, and it is not adequately financed to address disaster prevention and mitigation. For this reason, the Fund's resources are not stable and vary substantially, significantly increasing when a disaster does strike.

In **Bolivia**, along with the SISRADE, a Risk Reduction and Disaster Management Trust Fund (FORADE) was set up. Working under jurisdiction of the Ministry of Presidency, it is being supported through a regular contribution from the national budget. It will also channel international co-operation funds and distribute them through SENAR (formerly UTOAF) and SENADECI, to be used respectively in risk reduction and disaster management. The fund will support a broad range of activities including disaster prevention and mitigation projects and scientific research.

In **Germany**, though there is no national reserve fund, a special disaster relief and reconstruction fund, *Sonderfonds Aufbauhilfe*, was set up after the Elbe floods of 2002. It is a large fund, with a resource level of € 7.1 billion, created through budgetary sources and increase in corporate income tax. Most of these reserve / reconstruction funds are used as extra-budgetary sources. Within national budgets, there is no earmarked resource which is to be used as a calamity / reserve fund. Budgetary provisions may replenish them, if these funds are depleted.

Allocations for Disaster Risk Management at local level

In **Colombia**, despite legal provisions that all municipalities must assign resources to risk management and provide emergency services, only big and medium municipalities such as Bogota, Medellin, Cali, Manizales, and other cities are in a position to provide the infrastructure and services through their own resources. However, these municipalities too expect resources through national transfers when they face a major disaster. Most of the other municipalities in Colombia, which are small in population and limited in fiscal resources, depend heavily on national transfers. There is a perception among smaller municipalities that these transfers are not adequate.

The municipal government of Bogotá, the biggest city in Colombia, set up the Emergency Prevention and Management Fund of Bogotá (FOPAE in Spanish) in 1987. It is much bigger in size than the

National Calamity Fund, and receives col \$4000-5000 million annually through the city's budget. Its main objective is to provide financial support for a broad-based disaster risk management program, based on risk assessment, communication and education, disaster prevention and mitigation, and emergency response. The FOPAE also provides support for environmental sanitation in affected communities during rehabilitation, reconstruction and development phases. Within FOPAE, there is a Reserve fund fixed annually for financing all the expenditures on emergencies and helping people with recovery.

Table 6: Emergency Prevention and Management Fund - FOPAE

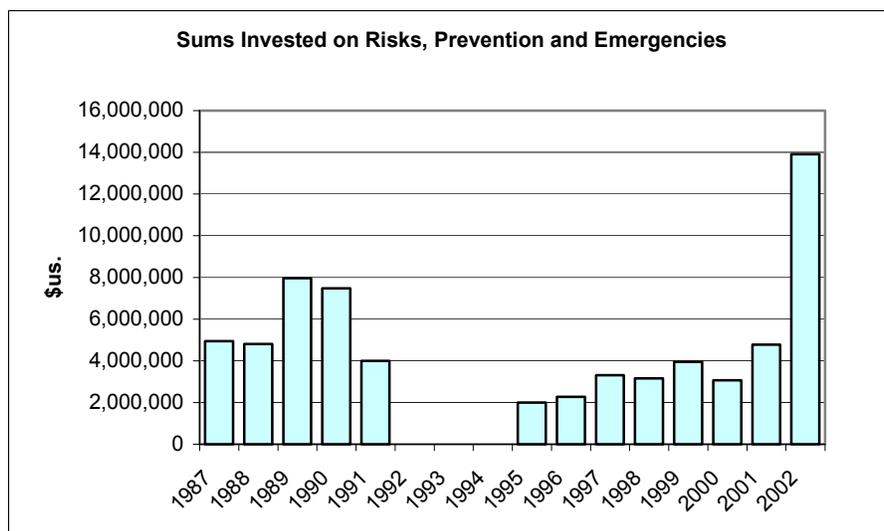
Figures in Thousands of Dollars

Concept	1997	1998	1999	2000	2001	2002
Operational Costs	173	359	280	192	169	161
Investment Costs	10.658	13.071	11.149	4.605	3.150	4.401
Total Costs	10.831	13.430	11.429	4.797	3.319	4.562
Exchange rate	1.141,08	1.427,04	1.75858	2.087,42	2.299,77	2.625,05

Source: Statistics provided by FOPAE

In **Bolivia** too, smaller municipalities and provincial administration have not allocated any resource for disaster risk management, except for the projects being implemented through international assistance. It is only a bigger city like La Paz, which has invested in disaster risk management. The annual investment in disaster risk management in the city has ranged from US\$200,000 to US\$1,400,000, based on estimates available with the municipal authorities.

Graph 2: Annual Investment in Disaster Risk Management in La Paz



Source: Prepared with data provided by the Municipal Government of La Paz, May 2002

All the municipalities are dependent upon the national transfers available through budget, or the resources available with FORADE. Allocations are made from the national budget upon declaration of a state of emergency, though it may be released to the national agencies for response and recovery. External donors also have their specific mode of assistance in case of disasters.

In Germany, municipal financial resources of Dresden and Pirna are discussed only in the context of Elbe floods of 2002. In Dresden, total losses in all sectors as a ratio of the budget amounted to 114 percent, and in Pirna 292 percent. Losses to municipal infrastructure amounted to 47 percent and 35 percent of the budgets in Dresden and Pirna respectively. City officials in both cities asserted that it would have been impossible to finance these losses, let alone compensate private households or firms.

Table 7: Losses in Dresden and Pirna in comparison

	Dresden in million €	Pirna in million €	Dresden % of budget 2002	Pirna % of budget 2002
Total losses	962	181.0	114%	292%
Losses to municipality	400	22.0	47%	35%
Budget 2002	847	62.0	-	-
Expected own municipal contribution (10% of losses)	40	2.2	5%	4%

Sources: Local governments of Dresden and Pirna, Mitteldeutscher Rundfunk (2003)

The municipalities expect to receive 90 percent of their losses in the currently ongoing negotiations from the *Sonderfonds Aufbauhilfe*. Thus, Dresden and Pirna will only have to finance five and four percent of their losses themselves respectively. These fractions will probably decrease, as donations and in the case of Pirna insurance indemnity payments will come forward. Due to declining income from corporation tax revenue in the last few years, both cities are heavily constrained in their financial means. City officials stated that they would not have been able to finance these losses through their own sources. Therefore, aid from the *Sonderfonds Aufbauhilfe* was welcome.

Insurance Payment at Local Levels

In Both **Colombia** and **Bolivia**, insurance coverage for natural disaster is low, both at the level of governments and private property-owners. Though public entities are required to purchase insurance for various contingencies including natural disasters, in practice this has not been followed. Though there is no strong public policy support for increasing the insurance protection, its coverage is also limited by the capacity to pay both in the public and private sector. However, in new private and public investments, insurance coverage is almost mandatory. In both **Bolivia** and **Colombia**, a systematic and large-scale risk transfer through insurance contracts still requires a major effort in terms of establishing an insurance market. There is the need for an active public policy support to insurance through incentives and regulations, which could be provided through national insurance regulatory authorities.

In **Germany** too, the insurance coverage has not been high. Out of total expected costs of reconstruction at € 9 billion, insurance indemnity payments are estimated to sum up to € 1 billion. At the level of local government, the insurance coverage was not high, particularly in Dresden. The city therefore expects to receive 90 percent of its losses through national and international sources with

50 percent to be disbursed in 2002-2003. In contrast to Dresden, municipal assets in Pirna were insured to a certain degree. This was felt necessary due to the high risk exposure of Pirna. The amount of indemnity that will be provided for reconstruction of the city is still unclear. The insurance coverage of households and businesses in these two cities has also not been high. In Dresden, about 25 percent of private businesses were insured.

International Assistance for Reconstruction

A considerable amount of resources in all three countries came from international sources. External assistance was in form of both loan and grants. In **Colombia**, the World Bank sanctioned a US\$225 million emergency loan to support reconstruction of Colombia's coffee-growing region, struck by the January 1999 earthquake. The loan supplemented the US\$93.2 million from existing projects reallocated to reconstruction works last August. The emergency loan provided resources for repair or total reconstruction of approximately 80,000 dwellings and reconstruction or repair of infrastructure and civic amenities. The IDB first pitched in with an emergency loan of US\$20 million, which was to be used for facilitating reconstruction. It followed up the emergency assistance with the authorization to redirect \$133.7 million in loans previously approved for Colombia into the emergency reconstruction and development program.

Bolivia has received financial assistance from a number of sources in the wake of El Niño-related disasters that struck the country in 1997-98. Like Colombia, the World Bank and IDB have provided a significant amount as loan for the purpose of reconstruction. One of the reasons behind the decentralization of the national disaster management system in Bolivia was that external donors were reluctant to provide financial resources to the Department of Defense. Table 5 shows the flow of resources from different sources for disaster risk management for the period 1997-2002.

Table 8: External Loan and Assistance for Disaster Risk Management in Bolivia

Total Summary per Source 1997 – 2002

Source	US\$	%
World Bank	25.521.610	23%
Inter-American Development Bank	21.077.000	19%
Japan	3.205.382	3%
UNDP	400.000	0.3%
EU	688.000	0.7%
Miscellaneous	3.037.046	3%
FADE	15.000.000	13%
TGN	24.319.678	22%
Prefectures and Municipal Governments	18.032.300	16%
TOTAL	111.281.016	100%

Source: Prepared by Vladimir Ameller Terrazas and Marco Antonio Rodriguez, 2003¹²

¹² The part of the study about Bolivia is found at the GTZ-website (see note 1, p. 2)

Germany, despite being a developed country is dependent on external help and assistance for reconstruction. Out of the total cost of reconstruction, the European Union (EU) solidarity fund for emergencies, newly created with an annual amount of € 1 billion, will support with a contribution of € 500 million. The contribution of different sources to the cost of reconstruction has been shown in the following chart:

Table 9: Sources of Financing for Post-Elbe Floods Reconstruction

Source	Amount (billion €)
<i>Sonderfonds Aufbauhilfe</i> (Federal and state governments)	7.10
EU	0.500
Donations	0.242
Insured losses	1.000
Total financing	8.842
Non-financed	0.226

Source: Compiled by Juergen Weichselgartner and Reinhard Mechler¹³

FINANCIAL SERVICES AND INSTRUMENTS FOR DISASTER RISK MANAGEMENT

Despite the growing importance of municipal finances in the total public investment and expenditure and the principle of subsidiarity, certain broad patterns in respect of local governments can be identified (Bird 2001). First, local governments are always constrained for resources, and depend upon transfers. Even with transfers, resources are often inadequate to provide even the most minimal level of many of the services with which such governments are charged. Second, as discussed in the beginning of this study, not all local governments are equal. Municipal governments vary significantly in their jurisdiction, staff, functions, budget, and capacity, with bigger cities having access to an incomparably high level of resources, and entrusted with a wide range of functions. A third common feature is that few countries permit local governments to levy taxes capable of yielding sufficient revenue to meet expanding local needs.

Disaster Risk Management as an Emerging Municipal Responsibility

These emerging features of fiscal federalism would influence financing for disaster risk management too at the level of local governments. However, unlike other subjects, such as water supply, roads, sewage, solid waste collection, health, and education, where roles of local governments in a country have been defined with some specificity, disaster risk management has not emerged as a discrete and well-defined activity. In Bolivia, for example, it is difficult to account for public investment in disaster prevention and mitigation, as no such expenditure category exists in the budget. There are certain aspects of disaster management such as fire services, which have traditionally been within the purview of local governments. In respect of other aspects such as flood protection works or post-

¹³ Compiled through following sources: Staatskanzlei Freistaat Sachsen (2002), Guy Carpenter (2002), Interview with M. Priesterath, from Task Force 'Flood Assistance', Federal Ministry of the Interior, December 10, 2002, by J. Weichselgartner. The part "Sources of Financing for Post-Elbe Floods Reconstruction" of the study is found at the GTZ-website (see note 1, p. 2)

disaster recovery, the traditional roles of national or sub-national governments have not changed much. As the scheme of decentralization in Latin America deepens, it is likely that local governments will assume greater responsibility in respect of disaster risk management.

A reasonable assumption could be made about what could be done by governments at different levels. Governments at the central and state level provide the policy and regulatory framework for disaster management. It also lies within the capacity of these governments to invest in large-scale structural mitigation measures. Post-disaster recovery and reconstruction programs require huge commitment of resources, as in the case of Germany, which can be managed only by central and state governments. On the other hand, local governments are required to maintain a basic infrastructure of emergency management, which includes fire services, transit shelters, health care, and immediate relief. The level of these services would, however, vary from one local government to another, depending upon the area, population, level of risks, and resources of respective governments. In addition to providing these emergency services, one of the primary functions of local governments could also be to support a number of community-based measures for reducing disaster risks. A list of community-based measures for different hazards is given in the Annex.

Financing Strategy for Disaster Risk at the Local Level

Local governments can incur expenditures on disaster preparedness and response from their general pool of resources. It may, however, be difficult for local governments to raise resources specifically for disaster risk management. Can local governments demand user charges or levy taxes or raise loans specifically for disaster risk management? User charges and taxes for emergency services may be politically unacceptable. People will not be willing to pay such a tax or charge. It may not also be possible to provide emergency services on the basis of recovery of actual costs, as it is being done gradually for water supplies in Colombia.

Municipal governments are privatizing many of their services. For example, municipal solid waste services have been privatized in major cities of Latin America such as Buenos Aires, Caracas, Santiago and São Paulo (Bartone 2001). Risks can be privatized, too. Utilities, businesses, and private property can transfer their risks by purchasing insurance if they find it feasible. However, "emergency services" is very much a public good, which cannot be privatized. Public subsidy for an important component of disaster management, which could be described as emergency services, is thus a necessity.

Local governments can borrow to finance disaster risks. However, borrowing is usually a minor source of finance for local governments in most developing countries. While in principle local governments can act as an independent entity for the purpose of borrowing, their access to credit is generally limited to prevent overexposure (Ebel and Vaillancourt 2001). Besides, it is unrealistic to expect local governments to borrow from external or domestic financial markets or float commercial bonds except to finance major capital expenditures.

This leaves municipal governments only with tax sharing and intergovernmental transfers among the regular sources of revenue for disaster risk management. Sub-national / local governments can get a share of tax revenues collected by central governments. An alternative arrangement is to permit local governments to levy their own broadly based taxes. Since revenues collected through these sources rarely permits local governments to meet their expenditure needs, transfers are always required to close the gaps. In fact, intergovernmental transfers or grants are the main source of revenue for most of the local governments. Central governments use transfers as means of influencing local governments in terms of sectoral patterns of local expenditure (Ebel and Vaillancourt 2001).

Intergovernmental transfers can be broadly classified as non-matching (lump sum) and matching. Non-matching transfers may be either conditional (selective) or unconditional (general). Conditional non-matching transfers offer a set amount of funds without local fund matching, provided the funds are spent for an established purpose. General or unconditional non-matching grants attach no constraints on how the grants are spent and, unlike the case with conditional grants, no minimum expenditure in any area is expected. Matching grants or cost-sharing programs are conditional transfers that require funds be spent for specific purposes and that the recipient match the funds to some degree (Shah 1999). These two types of transfers—conditional non-matching and matching grants—could be the most effective way of channelling resources for disaster risk management.

The effectiveness of transfers in financing for disaster risk management depends upon its design. The important issues are the criteria chosen for effecting transfers at the local level, instrument / facility through which transfer is effected, and the conditions attached to the use of transfer. Central governments can use these transfers very effectively to build the capacity of local governments and reduce disaster risks on a sustainable basis. We shall discuss these transfers here in the specific context of financing reconstruction, setting up calamity funds, and supporting safety nets including public-funded insurance programs.

Financing Reconstruction

When the central government passes on the proceeds of a World Bank or IDB loan to a sub-national or local government for post-disaster reconstruction, it is a case of conditional transfer of resources. Local governments need to utilize these funds for well-specified objectives. In Germany, for example, funds are being transferred from *Sonderfonds Aufbauhilfe* (a special disaster relief and reconstruction fund) to the municipalities of Dresden and Pirna on a large scale for the purpose of reconstruction. Municipalities must submit their detailed plans for reconstruction and determine priorities. The percentage of compensation was high, from a minimum of 90 percent to sometimes even up to 100 percent.

In developing countries governments tend to set up a special agency at the apex level, which derives its authority from the highest political body. The reconstruction programs are implemented on a more centralized basis, with little role for local governments. For example, in case of Armenia earthquake (1999) in Colombia, the Government assigned responsibility for managing the reconstruction project to the Fondo para la Reconstrucción y Desarrollo Social del Eje Cafetero (FOREC), a specially constituted agency. Though it has involved NGOs actively in the reconstruction program, local governments have little role to play in the entire reconstruction program.

The need to involve local governments in reconstruction was underscored when the IDB organized the consultative group meeting for the reconstruction of El Salvador. It suggested that reconstruction projects should be designed and executed in coordination with municipalities (by the administration itself or through contracting), community associations, and civil organizations operating at the local level. Besides, the projects must encourage agreements among municipalities, open lines of financing and other credit and mutual aid mechanisms for basic housing in rural areas, and provide technical support to municipalities in order to strengthen their operating and management capability (IDB 2001b).

Setting up Calamity Funds

In many countries calamity funds are being set up at national levels to address short-term needs following a disaster. We discussed the National Calamity Fund in Colombia, and the special disaster relief and reconstruction fund, *Sonderfonds Aufbauhilfe*, following floods in Germany. Elsewhere, Philippines, India, and Fiji have set up similar national funds to provide support in case of

contingencies. The advantage of creating such a fund lies in not asking for a new budgetary provision in the middle of a fiscal year to address post-disaster recovery and reconstruction needs. By using resources accumulated before disaster strikes, these funds smooth government expenditures at the municipal, local, national and even regional levels during a crisis. Besides, the calamity fund could also support specific *ex ante* investment in risk reduction. The institutional design of such funds should guarantee that they not be used for other purposes and that spending priorities not be influenced by political considerations.

In 1996, the Government of Mexico established a Fund for Natural Disasters (FONDEN). FONDEN is composed of three separate funds: infrastructure, agriculture and individual assistance funds. FONDEN has, however, not been capitalized sufficiently to cover its obligations. In 1998, for example, FONDEN's budget was about \$227 million, while its expenditures were expected to exceed \$500 million (Varangis 2001, Kreimer et al., 1999). The World Bank has recently provided a US\$404 million in 2002 to re-capitalize FONDEN and support wide-ranging activities related to disaster management.

At the regional level, EU set up a solidarity fund for emergencies with an annual amount of € 1 billion. The IDB set up an Emergency Reconstruction Facility for Natural and Unexpected Disaster Support endowed with US\$100 million to be used for emergency related temporary rehabilitation projects. The IDB has also set up a Disaster Sector Prevention Facility under which it can approve loans of up to \$5 million to finance efforts to reduce natural disaster-related risks. It is currently preparing such loans for projects in Bolivia and the Dominican Republic.

Independent of the budgetary cycle, these special funds for disaster management could be very useful for the local governments to access funds immediately. These funds could also be operated to provide incentives to local governments and communities to invest in mitigation and preparedness on a matching basis. However, the usual problem with these funds is that they are not sufficiently capitalized. Once the money is depleted, the replenishment of funds is delayed.

Supporting Safety Nets

Poor households in Latin America are exposed to a wide spectrum of risks. These risks are: ill health, disability, and death in the family, which are known as "idiosyncratic" shocks, and economic recession, natural disasters, and conflicts and civil wars, which are called "covariate" shocks. In addition to these risks, some of the households suffer from a chronic incapacity to work and earn. Financing and supporting people only during disasters while leaving out other household risks is not a sustainable arrangement. There is an established need to support social safety nets, especially in view of economic recession and huge unemployment in the region in the decade of 1990s. These safety nets work as both *ex ante* and *ex post* mechanism for dealing with disasters. In fact, when these safety nets are in place, people are more prepared in a pre-disaster situation, and they show greater resilience in a post-disaster situation.

Safety nets work better when they are decentralized. Implementing these safety nets at the local level reduces costs and improves targeting. Local governments and administrators may be better informed about members of their community and thus better able to identify their poor.

Local governments, however, may have the least own-source revenues with which to support them. In fact, safety nets, if they involve public works programs, are generally very expensive. An ideal solution to financing these programs is through pooling of financial resources from central, sub-national and local governments, and improving their targeting. Intergovernmental transfers are therefore more effective, when they are specified transfers and accompanied with matching resources from lower levels of government. In fact, equity considerations could be introduced through these transfers. For example, a rich local government might receive one central dollar for every three

dollars it raises and spends on safety nets, while a poorer local government might receive three central dollars for every one dollar it raises and spends on safety nets (Litvack 1999).

The most common examples of safety nets are employment programs, social funds, and social insurance for the unemployed and old. Of these, employment programs and social funds have been used for disaster risk reduction. After flooding in Chiapas, the Mexican government's temporary employment program (*PET*) provided families with much needed additional income by enabling them to work on reconstruction crews for one day a week. In northeast Brazil, the *Frente de Trabalho* program provides similar employment in periods of drought. During the 1979-84 drought, the program employed some 3 million workers in construction and drought-related jobs (IDB 2000a).

Similarly, following hurricane Mitch in October 1998, Social Investment Funds (SIFs) in Honduras, Nicaragua and Guatemala supported emergency projects, involving damage assessments, locating sites for resettling the homeless, and providing sanitation systems. In early November, the three SIFs began reconstruction efforts, focused on small-scale infrastructure and social services – bridges, schools, health facilities, roads, water and sanitation. Within days, SIF emergency response teams were deployed, and worked with local governments and citizens to address the most urgent reconstruction needs. In Honduras and Nicaragua, particularly, SIFs played an important role in helping communities cope and rebuild after natural disasters, though there are also opinions that these SIFs have not been very successful at reconstruction

In addition to these social funds, there is a wide array of *development funds* that can be used to finance investments in prevention and mitigation. In Latin America and the Caribbean there are municipal (urban and rural) development and environmental funds that can allocate resources for the prevention and mitigation of catastrophic events in addition to their normal activities. Some of these funds operate with reimbursable resources and allow the financing of major post-disaster reconstruction activities. Other funds operate with non-reimbursable financing and could be applied for seeding a range of mitigation measures (Keipi and Tyson 2002).

Among other important financial mechanisms for disaster risk management are contingent credit, insurance and microfinance. International banks extend contingent credit lines upon payment of a smaller fee up front. However, countries or public entities do not use contingent credit lines for recovery from disasters. It is not a very relevant financial instrument at the local level. Insurance is the most widely practiced insurance risk transfer mechanism all over the world. Microfinance has just emerged as an important social safety net. Private finance and NGOs are the leading stakeholders for insurance and microfinance respectively, though governments also are required to play a supportive role. For these reasons, we discuss these two instruments here independently.

Promoting a Comprehensive Insurance Approach

Most of the discussion regarding insurance as a risk transfer mechanism has taken place from the point of view of market-type insurance (Freeman and Kunreuther, 1997). While the insurance provided by private sector is very important, its coverage is circumscribed by its affordability. A comprehensive insurance approach, which involves both private and public-funded insurance programs as well as self-insurance, will be more useful in context of local governments in Latin America.

At the level of local governments, inadequate insurance coverage may be attributed to low perception of risks, expensive insurance, or lack of funds to pay for insurance. For example, in the Caribbean, the standard product offered by the insurance industry to the average property owner is expensive; more than half of the premium paid by the insured is allotted to commissions, profit, marketing, and administrative expenses. The underwriter pays little attention to catastrophe risk, and the industry does not offer the insured any incentive to reduce that risk (Vermeiren 2000).

One of the ways in which cheaper insurance options could be offered to local governments and residents and the risk pool be enlarged is through creating group-based, public-funded insurance programs. The group-based insurance programs provide incentives to the people to come together and initiate improvements in their physical surroundings in order to qualify for insurance benefits. The Homeowner Comprehensive Group Insurance plan in St. Lucia is a successful example of group-based property insurance and mitigation program (Vermeiren, 2000). Despite the predominance of private sector insurance, a number of developed countries have started providing support for homeowners' insurance, and there are a number of state-funded insurance programs in US, France and Spain (Kliendorfer and Kunreuther 1999, Freeman and Martin 2001 and Charveriat 2000). Most of these public-mandated programs have combined insurance with mitigation, which also shows the importance of insurance as an *ex ante* mechanism of risk reduction.

Developing Microfinance Services and Products

Microfinance is non-collateral financial service, consisting of savings, credit, and insurance, which is provided by non-governmental organizations and finance institutions. For poor households and communities, it is both an alternative to insurance and public-mandated social safety nets. Originally conceived as a poverty alleviation program, its impact on reducing income and consumption volatility has made it emerge as an important instrument of risk management in the last decade.

Microfinance instruments helps poor households diversify their income by source and season. Multiplicity of income-earning opportunities and asset building through microfinance help the poor households in dealing with disasters better (Pitt 2000). Access to credit, savings, and insurance services through microfinance can also improve transitory and chronic food insecurity in three ways (Zeller 1999). Microfinance thus acts as both *ex ante* and *ex post* risk management mechanism.

The role of microfinance as a coping mechanism was for the first time documented extensively during the 1998 floods in Bangladesh. During the period of June to September 1998, floods affected more than two-thirds of the country, causing extensive damage to agriculture, individual assets, and infrastructure. The Microfinance Institutions (MFIs), which serve millions of households in Bangladesh, helped their clients through short-term emergency loans to meet their immediate needs of consumption. The MFIs also rescheduled the existing loan repayments and allowed their members to withdraw from their compulsory savings. Once the floods receded, the MFIs provided loans for recovery and reconstruction. Though all the MFIs, big and small, struggled to maintain their liquidity, and reported significant losses of capital at the institutional level, they survived the crisis (Brown and Nagarajan 2000, Nayar and Fasal 1999).

The experience of the Bangladesh floods has created a new awareness among microfinance institutions of the need for providing special facilities and products for risk management. Special products and services such as flexible savings programs, short-term emergency loans and micro-insurance are being evolved to help households. However, these services require considerable investment in product development and pilot testing.

The Multilateral Investment Fund of the IDB recognized the need to support the MFIs for responding to natural disasters. It has sanctioned US \$10 million towards an emergency financing mechanism for natural disasters. The facility will guarantee the availability of the contingency resources to both micro-enterprises and microfinance institutions so they could get back on the road to financial and operational self-sustainability after dealing with the adverse consequences of natural disasters (IDB 2001c).

CONCLUSIONS AND RECOMMENDATIONS

Financing disaster risks through different alternative mechanisms is a relatively new idea in developing countries. In developed countries, a system of insurance and incentives has been in place for quite some time. New financial instruments that are commercially traded, such as catastrophe bonds and weather derivatives, have emerged. Still, the discipline of disaster risk management is lagging behind environmental management, where since early 1970s economic instruments are being used. The Organization for Economic Cooperation and Development (OECD) has documented more than 60 taxes in force in different countries for controlling air, water, and soil pollution, solid wastes and noise pollution. In addition to these taxes, there are fees, charges for non-compliance with standards, deposit and reimbursement system, tradable permit systems, bonds contingent on environmental performance and subsidies for environmental protection (ECLAC and UNDP 2002).

Public-funded programs run the risk of crowding out private efforts to mitigate risks, or encourage them to engage in unsafe practices (Vatsa and Krimgold 2000). Households and communities tend to be dependent upon public-funded programs for preparedness, response and recovery. It is therefore necessary to pool both public and private resources for disaster risk management, and build a range of incentives for implementing them.

Financial Strategy for Local-Level Mitigation Investment

Based on the recognition of a more broad-based approach to disaster risk management, a multi-pronged strategy could be proposed for investing in preparedness and mitigation at the local level. These are: a. Supporting local governments through assignment and transfer of resources; b. Financing community-based mitigation programs; c. Partnering with financial institutions for mitigation incentives; and d. Maintaining social safety nets at the local level.

a. Supporting local governments through assignment and transfer of resources: Disaster is always a concurrent subject. It invokes jurisdiction of governments at all levels: national, provincial / state, and local. Local funds for disaster risk management are always limited, and national and state transfers are still the most important source of financing for cities. Central and state governments therefore need to provide conditional matching or non-matching grants to local governments, based on disaster risk assessment of regions and cities. Besides, a share of certain tax revenue may also be assigned for the purpose of local capacity building. It is always preferable to provide matching funds to local governments, as it creates incentives for the local governments to raise their sources and get more involved with mitigation. Transfers need to be linked to capital investment in preparedness and mitigation, while the revenue assignments can be used for maintenance of facilities and services.

b. Financing community-based mitigation programs: Community-based programs, a more cost-effective approach to mitigation, could be funded through different mechanisms. Again, while there must be incentives for a community to undertake mitigation, communities too need to contribute their resources. In Bolivia, for example, intense deforestation along the slopes of the Grande river in the municipal district of San Julián has increased floods risks significantly. The GTZ-supported municipal risk management project has been successful at pooling the resources of municipal government, communities and other stakeholders such as Red Cross and civil defense committees. At the level of communities, 45 risk management plans have been prepared.

c. Partnering with financial institutions for mitigation incentives: It is also important for governments at different levels to set up partnerships with financial institutions for promoting risk management mechanisms. For example, the insurance market for catastrophic risk in the Caribbean region remains a “thin” market characterized by “high” prices and “low” transfer of risk. These market

failures explain the lack of development of the catastrophe insurance in the region and could be addressed only through public sector interventions (Auffret 2003). Similarly, governments, NGOs and donors can work with the MFIs to develop more flexible loan and savings products that the households could access when faced with a major disaster or a crisis.

d. Maintaining a social safety net at the local level: What is required is an expanded concept of social safety nets, which combines basic safety net with environmental and economic safety nets (Barahona, et al. 1999). As discussed earlier the level of expenditures on social security is low in Latin America. National governments need to step up the expenditure on social safety nets, with greater authority and flexibility to local governments to implement these safety nets. However, safety nets are at times misused at the local level, which necessitates proper safeguards in their targeting and implementation.

Financial Instruments and Services for Disaster Risk Management

Following the broad strategies outlined above, financial instruments and services can be designed and promoted for disaster risk management. These instruments and services—insurance, microfinance, social funds, public works program, etc.—have been discussed in Section 4 in the context of Latin America. Many of these social protection applications have a very fledgling record in respect of disaster risk reduction. In fact, with the exception of insurance, these instruments are not generally associated with disaster risk management.

These financial instruments and services are sometimes discussed in terms of *ex ante* and *ex post* mechanisms. However, the distinction between *ex ante* and *ex post* is mere contextual. In fact, these instruments could be used as both *ex ante* and *ex post*. Insurance is generally considered as an *ex post* mechanism. However, an effective insurance is always combined with mitigation. With certain risk reduction measures in place, insurance premiums are more viable. Savings and credit, offered by microfinance services, are helpful in reducing the risks before the disaster and smoothing income and consumption following the disaster. Similarly, social funds can finance mitigation programs as well as post-disaster reconstruction. It is more critical to assess which of the interventions would be most cost-effective and sustainable at a given stage of disaster risk.

The development of these financial instruments and services, however, require innovation and public policy support. For example, social funds and microfinance have just emerged as risk management mechanisms. Similarly, a great deal of variation could be introduced in insurance products to make them more attractive and affordable to the potential insurers. Multilateral development banks and donors can play a very important role in the development of these instruments and services. In addition to these financial instruments and safety nets, a number of facilities need to be set up for improving disaster risk management at the local level. These are discussed as follows:

Investment in Emergency Services Infrastructure: It is imperative that all local governments invest in a basic emergency management infrastructure. It may include early warning, fire services, emergency medicine, and rescue equipment. These services must be financed on a regular basis in the local-level development schemes. These resources at the level of local governments contribute to the national pool of emergency management services, which could be accessed by public entities in case of bigger disasters.

Establishing a Reserve Fund: It is always very useful to set up a reserve fund at the level of local governments through a tax or revenue assignment. The reserve fund may be small, but it plays an important role in dealing with contingencies, and supporting smaller programs in capacity-building and community education. A reserve fund must be viewed as an essential part of the municipal

finance. Further, its funds must be used for specified purposes only, and hence these funds must be set up with adequate legal safeguards.

Insurance Protection for Critical Installations: Local governments need to undertake insurance of their assets in a gradual way. It may not be possible for them to insure all the buildings and civic facilities at one go. It is important to prioritize. Critical installations in the area of power and gas may be insured first, followed by other utilities. For buildings owned by local governments, a building renewal fund could be set up through an annual contribution. The renewal fund can be used for repairing old buildings, or replacing them when buildings collapse in disasters.

Sharing the cost of Reconstruction: Even in an ideal situation, local finances would be inadequate for meeting the cost of post-disaster reconstruction. Local governments will require financial help from state and central governments, even international assistance. However, it is necessary that local governments provide part of counterpart funding for reconstruction. It improves their stake holding and participation in reconstruction programs.

It must be kept in mind that transfer of responsibilities to the local governments is a positive trend to the extent that the local governments assuming such responsibilities are prepared for them and are capable of mobilizing their own resources. Since disasters tend to overwhelm public entities, local governments may always need the support of central and state governments. However, an appropriate balance of capacities and resources between different levels of government in a country will be a more feasible and sustainable system of disaster risk management.

INDICATORS AND OTHER INSTRUMENTS FOR DISASTER RISK MANAGEMENT AT THE LOCAL LEVEL

INTRODUCTION

Objectives

Expected benefit of this part of the study is to develop a methodology, based on a set of indicators, that will:

- Systemize and harmonize the presentation of risk information from community level,
- Improve the capacity of decision-makers on local and national level to measure key elements of disaster risk and vulnerabilities towards risk of communities,
- Provide comparative parameters to monitor changes in disaster risk, as a measure of evaluation of effects of policies and investments in disaster management, and
- Point at the major deficiencies in confronting natural disasters and thus indicate possible areas of intervention.

General Disaster Risk Management and Indicators Concepts

There are various approaches to conceptualize risk in the context of natural disasters with differing and sometimes contradicting definitions. However, there is a convergence towards the understanding of *risk* being the "probability of harmful consequences, or expected loss (of lives, people injured, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between *natural hazards* and *vulnerable/capable conditions*. An actual impact with consequences or losses that exceed the ability of an affected community or society to cope using its own resources, is termed a *disaster*." (ISDR 2002).

Disaster risk management is about the development and application of policies, strategies and practices for disaster risk reduction¹⁴. It aims to minimize prevailing conditions of vulnerability, to avoid (prevention) or to limit (mitigation) adverse impact of hazards, to respond to emergencies and act in the aftermath of disasters (rehabilitation and reconstruction). (ISDR 2002).

It is only recently that systematic work on indicators on risk management has started. In 2001 UNDP began to develop a vulnerability risk index for least developed countries and is currently preparing a World Vulnerability Report (ZENE 2002). The Global Vulnerability Index will compare countries according to their level of risk over time. The index will identify countries' social and economic vulnerabilities, along with hazards caused by natural conditions and human activities that contribute to risk. Other prominent (inter) national publications are the annual World Disaster Reports of the International Federation of Red Cross and Red Crescent Societies and the annual reports of the internationally active re-insurance company Munich Re Group. However, the presented statistics of both institutions are limited to the impact of past disasters and do not consider vulnerabilities or capacities.

While the UNDP exercise is a purely (inter) national approach, there are only some risk assessment models described in literature that appear to be in use by emergency managers and practitioners at commune level. A recent review of these has been undertaken by Pearce (Pearce 2000).

¹⁴ See note 5, p. 6

Contrary to national risk assessments that are based on existing highly aggregated statistical data, so far community based risk and vulnerability assessment approaches are process oriented. They are geared towards specific intervention planning and can stretch over various months with intensive broad-based involvement of the community. They are mostly based on checklists and have neighborhood or even household focus. The employed appraisal methods do not allow the use of the results for a comparison of different communities, nor are they consistent and structured enough to serve as a monitoring tool.

The proposed indicator-based vulnerability and risk assessment approach at the community level, with its intended benefits, can therefore be seen as a truly pioneering exercise. An indicator-based system is, however, an analytical, not an implementation, tool. It can be seen as an initial step that is followed by a detailed (participatory) intervention planning.

Criteria for Indicators

A systematic review of literature identified the factors that determine the loss of lives and lead to material damages during disasters in Latin America. These factors were organized into a conceptual framework. In a second step, suitable indicators were chosen to represent the identified factors. This set of indicators allows for measuring key elements of disaster risk the communities are facing.

There are five criteria that were used to select the indicators for the identified key elements. Each one is presented below along with an illustrative question in guise of an explanation:

- Validity - Does it measure the key element under consideration?
- Reliability - Is it a consistent measure over time?
- Sensitivity - When the outcome changes, will it be sensitive to those changes?
- Availability - Will it be easy to measure and collect the information?
- Objectivity – Can the data be reproduced under changing conditions?

Specific consideration was given to the requirement of the indicators to be easily applicable in data-scarce environments by communities and local authorities. To this end required key information was defined to be available from knowledgeable people on community level. A questionnaire collects the information. Scientific survey data can support this information, but is not essential.

To be able to indicate to communities their current position regarding various risk factors and their performance in risk reduction, each indicator comes with cut-off-points that group the communities indicator value into a high, medium or low category.

An indicator system can be made especially useful for policy decisions if it feeds into an indexing system that can be used to compare different communities across a country and monitor progress of risk management policies and measures. This is accomplished by simplifying the interpretation of data, condensing often technical information to summary figures. Some ideas towards an indexing system are presented in chapter Towards a Community Disaster Risk Index.

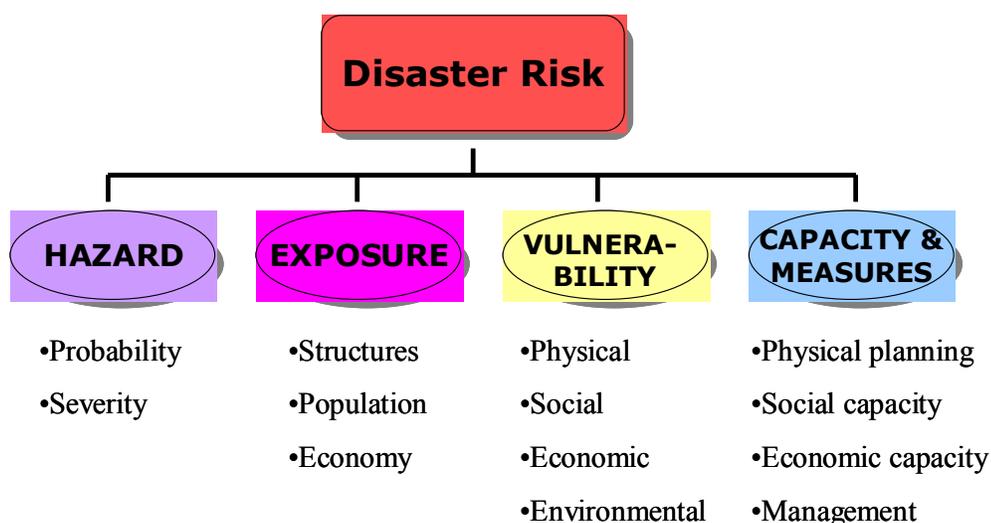
Using case studies from Guatemala and Switzerland, employed risk and vulnerability assessment methods are described. At the same time the elaborated indicator system is applied and validated.

COMMUNITY BASED INDICATOR SYSTEM

Conceptual Framework

For the conceptual framework, those main factors were identified that are believed to determine disaster risk at commune level in Latin America. These are: Hazard, Exposure, Vulnerability and Capacity & Measures¹⁵. The underlying understanding is that in order to manage risk, decision makers and local communities need to understand the threat posed by a *hazard*, the magnitude of lives and values *exposed* to the threat, the specific susceptibility towards hazards through present *vulnerabilities*, and the range of *capacities & measures* to protect against risk¹⁶. These four factors are suggested to form a conceptual framework (graph 3) that subsequently provides the rationale for the choice of indicators to be included in the risk analysis.

Graph 3: The Conceptual Framework



The Indicators

The presented indicators were selected according to the established framework applying the criteria of suitable indicators discussed before in the introduction under the heading Approach.

The indicator selection not only takes existing work into consideration, but also builds on experiences gathered with implementation in Latin America, Asia and Europe. The limitation of existing work is, that collected data is rather descriptive than analytical and gathered in different ways, making comparisons difficult. They also are applied either on the micro-scale, with extreme focus on local detail (individual and household level) or on a national or regional scale where data is so aggregated and generalized that the underlying processes are difficult to discern (Vogel 1997).

A comprehensive community level indicator system to measure key elements of disaster risk and changes in that risk is therefore a rather new and unique exercise. Basic idea behind it is to establish a "baseline" assessment of the hazards, exposure and current vulnerabilities and capacities, so that possible future changes can be captured and ideally tied to applied policies and measures.

¹⁵ For the factors of the conceptual framework see also Davidson 1997.

¹⁶ ISDR acknowledges capacity as a key factor in the disaster risk formula. The incorporation of vulnerability and capacity into tools such as risk indexes, along with clear targets or benchmarks and indicators, will engage the work towards highlighting disaster risk efforts. The Global Risk Vulnerability Index under development by UNDP, as well as the framework to monitor progress on risk reduction, being developed by ISDR, are good examples of current efforts towards that objective. (ISDR 2002).

Table 10 presents the indicators in brief, grouped according to the main factors and factor components. The indicators itself with the suggested measurements are detailed in separate Indicator Description Sheets to be found as online document "Application Guide and Indicator Explanation", which also discusses rational and validity of the indicators to make them operational on community level at (see note 1, page 2). To gather the data for the indicators, a questionnaire to be administered to the communities was developed. It can be found at the same web site.

For each indicator, cut-off-points are then provided, which result in low/medium/high classes for each indicator. This gives the local level an immediate feedback whether their community is at the lower, medium or upper level regarding each captured aspect. This also creates immediate awareness e.g. about existing vulnerabilities or deficits in capacity.

In the following chapters the rational of the conceptual framework and the logic behind the selected indicators are discussed.

Hazard

Hazard stands for the threat a community is facing resulting from a possible occurrence of a natural phenomenon (flood, earthquake, etc.). It is determined by its probability and severity exhibited at a certain location. (among others: ISNDR 2002). According to their importance in Latin America floods, storms, earthquakes, landslides, droughts, and volcanic eruptions are considered (Chaveriat 2000).

The "occurrence (experienced hazardous events)" (H1) reflects the history of an event and gives us thus an indication of the frequency/probability. As an alternative the "occurrence of a possible hazardous event" (H2) indicator can be used, which reflects the probability of a hazardous event the community might not be aware of, because it is without historical precedent or has occurred more than a generation ago and might thus not be remembered. This information has to come from scientific sources.

The severity of natural events is usually measured for a specific location applying hazard-specific scales (e.g. the Richter scale for earthquakes, Beaufort wind strength, 100 year floodplain level etc.). Given the data scarce environment and to obtain a common denominator to make different hazards comparable, instead of different hazard specific scales, a "proprietary" intensity scale is used ("intensity" (H3) or (H4)). Produced destruction serves as a proxy for the intensity of a hazardous event. To capture multi-hazard environments all experienced events are assessed separately one after the other.

Table 10: Set of Community Based Disaster Risk Indicators

Factor Component	Indicator Name	Indicator
HAZARD		
Probability	(H1) Occurrence (experienced events) (H2) Occurrence (possible events)	Frequency of events in the past 30 years. Probability of possible events. Chances per year.
Severity	(H3) Intensity (experienced events) (H4) Intensity (possible)	Intensity of the worst event in the past 30 years Expected intensity of possible events
EXPOSURE		
Structures	(E1) Number of housing units (E2) Lifelines	Number of housing units (living quarters). % of homes with piped drinking water.
Population	(E3) Total resident population	Total resident population.
Economy	(E4) Local gross domestic product	Total locally generated GDP in constant currency.
VULNERABILITY		
Physical/demographic	(V1) Density (V2) Demographic pressure (V3) Unsafe settlements (V4) Access to basic services	People per km ² . Population growth rate. Homes in hazard prone areas (ravines, river banks, etc). % of homes with piped drinking water.
Social	(V5) Poverty level (V6) Literacy rate (V7) Attitude (V8) Decentralization (V9) Community participation	% of population below poverty level. % of adult population that can read and write. Priority of population to protect against a hazard. Portion of self generated revenues of the total budget. % voter turn out at last commune elections.
Economic	(V10) Local resource base (V11) Diversification (V12) Stability (V13) Accessibility	Total available local budget in US\$. Economic sector mix for employment. % of businesses with fewer than 20 employees. Number of interruption of road access in last 30 years.
Environmental	(V14) Area under forest (V15) Degraded land (V16) Overused land	% Area of the commune covered with forest. % Area that is degraded/eroded/desertified. % Of agricultural land that is overused.
CAPACITY & MEASURES		
Physical planning and engineering	(C1) Land use planning (C2) Building codes (C3) Retrofitting/ Maintenance (C4) Preventive structures (C5) Environmental management	Enforced land use plan or zoning regulations. Applied building codes. Applied retrofitting and regular maintenance. Expected effect of impact-limiting structures. Measures that promote and enforce nature conservation.
Societal capacity	(C6) Public awareness programs (C7) School curricula (C8) Emergency response drills (C9) Public participation (C10) Local risk management groups	Frequency of public awareness programs . Scope of relevant topics taught at school Ongoing emergency response training and drills. Emergency committee with public representatives. Grade of organisation of local groups.
Economic capacity	(C11) Local emergency funds (C12) Access to national emergency funds (C13) Access to international emergency funds (C14) Insurance market (C15) Mitigation loans	Local emergency funds as % of local budget. Release period of national emergency funds. Access to international emergency fund. Availability of insurance for buildings. Availability of loans for disaster risk reduction measures. Availability of reconstruction credits.

	(C16) Reconstruction loans (C17) Public works	Magnitude of local public works programs.
Management and institutional capacity	(C18) Risk management committee (C19) Risk map (C20) Emergency plan (C21) Early warning system (C22) Institutional capacity building (C23) Communication	Meeting frequency of a commune committee. Availability and circulation of risk maps. Availability and circulation of emergency plans. Effectiveness of early warning systems. Frequency of training for local institutions. Frequency of contact with national level risk institutions.

Exposure

Exposure describes the people (population), the value of structures (structures) and economic activities (economy) that will experience an extreme natural phenomenon and may be adversely impacted by it. Exposure will indicate the decision makers what is at stake if disaster hits, for it makes a difference if a small community or a big city is threatened by a hazardous event.

Exposed structures are assessed in a simplified manner by considering the number of "housing units" (E1) only. Main interest is in magnitude and not in actual economic values. Since industrial sites, public infrastructure etc. is assumed to grow proportionately with the housing units, no additional indicators are used to capture them. "Lifelines" (E2) at stake are gauged by the availability of piped water in houses, which also reflects the development level of a community. The indicator is supposed to represent also other lifeline services such as electricity, sewage and communication. The indicators of "total population" (E3) and "Local gross domestic product GDP" (E4) for the economic exposure are self-explanatory.

Vulnerability

Vulnerability lists a number of factors that represent the susceptibility towards a hazard, grouping it into physical, economic, social and environmental vulnerabilities.

The term "vulnerability" is used in a very large number of ways depending on the audience and decisions in question. ISDR (2002) defines vulnerability as "a set of conditions and processes resulting from physical, social, economical and environmental factors, which increase the susceptibility of a community to the impact of hazards". For our purpose we identified a number of structural key vulnerability components, which influence the probability of a community to suffer human and material damages when exposed to a natural event. The extent of such damages can, in turn, be reduced by approaches that were grouped under Capacity & Measures (see below).

Physical/demographic Vulnerability

As the main physical vulnerability the "density" of the population (V1) is seen. When people are concentrated in a limited area, a natural event will have a greater impact than if people are dispersed. Closely linked is the "demographic pressure (V2)" expressed as the population growth rate. Population pressure, especially as in-migration to urban areas, is seen as a main contributor to unsafe living conditions in terms of location, building standards, service provision and social infrastructure. Directly at risk are those parts of the population living in unsafe settlements in high-risk areas such as along river shores or steep slopes ("unsafe settlements" (V3) and in more general terms, those parts that lack "access to basic services (V4)".

Social Vulnerability

Besides the fact of people in general being exposed to a hazard, most of the literature on vulnerability identifies as being particularly vulnerable the elderly, the very young, the poor, the socially and physically isolated, the disabled and ethnic groups (Buckle 1998). In the current

approach, for simplicity reasons, it is argued that good proxies to cover all the abovementioned main dimensions of vulnerability of groups within a community are the "poverty level" of people (V5) and the education ("literacy rate" (V6).

An important factor that drives the response towards risk is the perception of risk and the priority it is given to. "Attitude" (V7) tries to capture this aspect. The more decentralized a system is, the better it can react on risk management needs. The chosen "decentralization" indicator (V8) measures the portion of own revenues as a part of the total local budget. There is evidence that the more a society is allowed to participate in decision making and thus being in a process of democratization and empowerment, the less vulnerable they are towards suffering from disaster. Without being able to clearly determine the exact driving forces behind this processes of "community participation" (V9) a proxy indicator to capture this effect might be the voter turnout at community elections.

Economic Vulnerability

The "local resource base" (V10) expressed as the total available local budget, is a key aspect to determine the strength of a community to cope with a disaster. The less diverse a society is, the higher is the susceptibility also in the medium and long run to recover from a disaster. This is summarized by the "diversification" indicator (V11), asking for the mix of sectors, income stems from. Recent studies indicate¹⁷ that small businesses (fewer than 20 employees) are particularly vulnerable to disaster impacts and losses because they have relatively low levels of disaster preparedness and relatively little capacity to recover. The vulnerability of economic activities, therefore, is represented by the indicator of "stability" (V12), expressed as a percentage of businesses with fewer than 20 employees. Communities in danger of being isolated are more vulnerable when it comes to evacuation, emergency support or flows of goods and services in a post disaster situation. This aspect is reflected in the "Accessibility" (V13) indicator, measuring previous occurrences of interruptions of physical access in the last 30 years.

Environmental Vulnerability

Environmental vulnerabilities are hazard specific. While there is little vulnerability towards earthquakes and volcanic eruptions, landslides and hydro-meteorological hazards are favored by poor ecological environments, specifically a lack of "area under forest" (V14) and "degraded land" (V15) that determine the rain absorption capacity of the soil. A potential vulnerability is indicated if agricultural land is overused threatening the sustainability of production. The percentage of overused agricultural land, "overused land" (V16) captures this effect.

Capacity & Measures

Without hazard assessments, exposure measures and vulnerability studies, communities will not know in what way they are vulnerable and how hazards may affect them.

Vulnerability and capacity are closely linked and can in fact not be separated since an increase of capacity means at the same time a decrease of vulnerability. Measures that reduce the vulnerability also reduce the disaster risk.

The distinction made in this approach groups structural factors under vulnerability, while those factors that can actively be influenced were placed under the heading Capacity & Measures. While Vulnerability focuses on the underlying factors of a community's vulnerability (inherent weaknesses, structural factors etc.), Capacity & Measures is about measures of prevention, mitigation, preparation, response and rehabilitation & reconstruction, grouped into the thematic rather than

¹⁷ Cited after Davidson and Lambert (2001) who make reference to Alesch et al. (1993) and Tierney, and Dahlhamer (1998).

chronological topics of (1) physical planning and engineering, (2) management and institutional capacity, (3) economic capacity and (4) societal capacity. They reflect all policies, systems, kinds of public and private investment on community level that help to prevent disaster, mitigate their effects, prepare society to cope with extreme events and assist victims to recover (Wisner 2000). In this way the Capacity & Measures indicators will point to the risk reducing potential of a community, which is directly addressable.

Indigenous strategies to deal with disaster are not explicitly considered. They are very diverse, hard to identify and often location specific only. While these strategies play an important role in the intervention planning and need to be carefully analyzed, for a community level risk assessment their omission does not really pose a problem, since we only underestimate the actual capacity.

Basic idea behind the Capacity & Measures indicators is the assumption that there is a limited number of interventions that can improve the risk reducing capacity. Assessing them over the years will directly indicate the progress made by policies that should subsequently lead to a reduction of vulnerabilities and risk.

The capacity status is assessed in form of questions. In addition to asking whether a certain factor is present, a qualitative judgment is required that gives information on the expected performance or impact of the factor; e.g. the mere existence of an emergency plan will not reduce the risk unless relevant institutions are informed and regular drills show that the plan is working.

Physical Planning and Engineering

"Land use planning" or zoning (C1) keeps away production and buildings from hazard prone areas such as flood plains and thus reduces the impact of disasters. "Building codes" (C2) influence the way buildings are constructed to make them more resistant to disaster. "Retrofitting/maintenance"(C3) has the same effect, but applies to buildings already in place. "Preventive structures" (C4) are built to directly limit the impact of a hazardous event (e.g. dykes, retaining walls, dams, barrages, etc.). The "Environmental management" indicator (C5) stands for proactive measures that can positively influence the severity of an event and does also reflect a heightened awareness of the role the environment plays.

Societal Capacity

Societal capacity is about awareness and participation. Awareness has to do with education and a culture of risk management. The indicators represent to which degree the public understands the dangers associated with hazards and how to prepare for and respond to them. Key indicators are whether "public awareness programs" are carried out (C6), whether risk management is part of the "curricula in schools" (C7), whether "emergency response trainings (drills)" (C8) are conducted and whether a broad "participation" (C9) of society in tasks of risk management is searched for and whether "local risk management/emergency groups" (C10) exist.

Economic Capacity (Risk Transfer)

It is often not possible to eliminate completely the vulnerability of key assets either because some assets, due to their function or to prior location decisions, are located in hazardous areas or because retrofitting is too expensive. In such cases it is important to reduce financial risk through risk transfer mechanisms, which ensure that funds are readily available to rectify the damage or replace the facility, should a loss occur (World Bank 2002).

Classical instruments of risk transfer are access to local, national and international "emergency funds" (C11, C12, C13) and insurances for house owners through an "insurance market" (C14). Loans for "mitigation" (C15) and "reconstruction" (C16) are well known financial instruments to

protect loss of assets. "Public works" programs (C17) can be used for a wide variety of risk reducing measures, reflecting the strength and willingness of a local government to act.

Management and Institutional Capacity

Prerequisite for a coordinated effort on community level is the existence of a functioning "risk management/ emergency committee" (C18). The "existence of a risk map" (C19) already represents a major step towards systematically tackling risk. An "emergency plan" in place (C20) reflects an active administration and is an important element to reduce human losses. An "early warning system" (C21) works into the same direction. "Institutional capacity building" (C22) is a cornerstone of activating and improving performance of existing institutions like police, fire brigade, hospitals, etc. for risk management. Established "communication" (C23) reflects the important link to national institutions, not only in case of an emergency.

Application

All information is supposed to be collected at the community level using a questionnaire¹⁸. It can be completed and verified through information from secondary sources. To get reliable information, a group of knowledgeable people at the local level should be gathered. They should include formal and informal community leaders (like the governor, mayor, administrative heads, elders, etc.), members of risk management groups, historians, representatives of the public and the private sectors (factory owners, architects, etc.), as well as marginalized and thus vulnerable groups.

By systemizing the information into the four factors, the driving forces behind risk at the community level becomes obvious. The provided cut-off-points for each indicator gives the community an immediate feedback whether they are at the lower, medium or upper level regarding each captured aspect.

Based on that insight, further assessment steps can be initiated to plan necessary key interventions. Subsequently, regular application of the indicator system will allow monitoring changes in identified risk vulnerabilities and capacity deficiencies as a measure of evaluation of initiated policies and interventions.

Limitations

The advantage of a systematic indicator system based on a direct questionnaire approach on commune level is especially convincing in data scarce environments. However, there are some issues that merit consideration.

The selected indicators only approximate or interpret a complex situation we would like to measure. They are not really a measure of the situation itself. Although the indicator set has been condensed from past experience and current research, the combination and use of such an indicator system is new. It is based on the hypothesis that the indicators we have put into the conceptual framework pick up the determining forces and thus give us a proper picture of the existing risk. Only a test application can validate the indicators for suitability and policy sensitivity.

The defined cut-off-points for the low/medium/high grouping of indicator values are rather subjective and need to be adjusted for the specific geographical and cultural context of each country. The challenge is to define sensible low/medium/high groups that actually reflect qualitative differences in these groups. Experience has to be gathered on this aspect.

¹⁸ The use of the indicator system is described in a separate document titled "Application Guide" at the GTZ-website (see note 1, p. 2). At the same site also the questionnaire can be found.

The data comes from selected people on commune level. The quality of the data will therefore depend on the knowledge of those people. While most of the information can be validated through statistical sources (e.g. density, budget etc.) some information is qualitative and depends on the subjective assessment of the respondents (e.g. environmental management: many/some/few). This is especially critical if the system is used to monitor progress and distinctive interests could bias the answers. It is therefore important to have a well-composed respondent group and to come to a standardization of procedures and measurements.

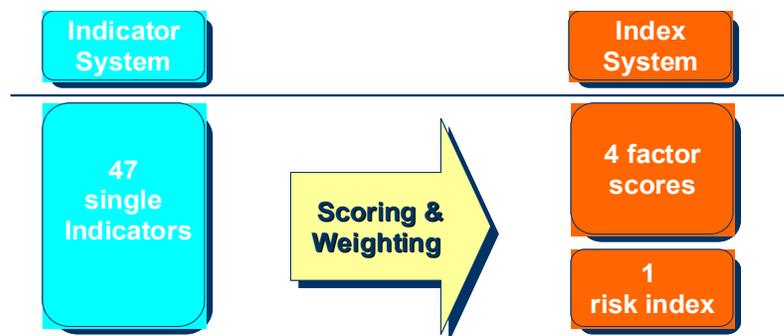
For the application we have to bear in mind that the indicator system is only one element within a comprehensive risk management approach. It documents the current situation of a commune. For actual intervention planning additional (participatory) location specific analyses of hazards and vulnerabilities are necessary. Risk maps e.g. are in addition suitable tools to illustrate results.

Using the indicators, a meaningful comparison between communities can only compare those affected by the same hazards. This is because many indicators are hazard specific. A "low" vulnerability rating for the "area under forest" (V14) has not the same meaning for drought than it has for floods or land-slides. Also is the lack in capacity of an "early warning system" (C21) for earthquakes acceptable (because of unpredictability of earthquakes), while it is very important for floods. This shortcoming can be addressed through an indexing system that uses hazard specific weights, as it is proposed in the following chapter.

TOWARDS A DISASTER RISK INDEX OF COMMUNITIES

The indicator system gives good insight into the current situation of a community regarding the risk determining factors and allows tracing changes in those factors over time. However, to be able to compare different communities across different hazards and to facilitate interpretation of the data, an indexing system is proposed. It will condense the technical and individual information of the indicators into comparable summary figures that allow direct comparison of the relative overall disaster risk of communities in a country, and describe the relative contributions of various factors to that overall risk.

Graph 4: Indicator and Index Systems



Indices are appealing because of their ability to summarize a great deal of often technical information about natural disaster risk in a way that is easy for non-experts to understand and use in making risk management decisions. There is growing interest among academic researchers, development banks, governments, and the insurance industry to use indices to make systematic comparisons of natural disaster risk in different countries and regions.

The presented indexing exercise was inspired by the FEMA approach (as described in Pearce 2000) for its simplicity and influenced largely by the work of Davidson (1997, 1998) and Davidson and Lambert (2001).

In a first step, the different measurements of the individual indicators (e.g. 30,000 residents and 30% poverty level) have to be made comparable through scaling. This is done by assigning a value of 1,2 or 3, in accordance to the category achieved (low, medium or high).

Since indicators have different meanings for specific hazards, in a second step, a hazard specific weight has to be found and applied.

Then, separate composite indices (scores) can be calculated for the four main factors that contribute to the risk — Hazard, Exposure, Vulnerability and Capacity & Measures. All the indicators that relate to Hazard are combined into the Hazard index, all the indicators that relate to Exposure are combined into the Exposure index, and likewise for the remaining two factors. Depending on the scaled indicator values the factor indices (scores) vary between 0 and 100.

In a last step the "overall" composite risk index is derived from the four factor indices resulting again in a score that ranges between 0 and 100.

Indicator and Factor Scores (Scaling and Weighting)

Scaling performs the first comparison by transforming each value of an indicator into a scaled value, simply by assigning the integer values of 1, 2 or 3 according to the low, medium and high category the indicator was grouped into. A 0 is given if the indicator does not apply. Scaling thus converts the indicators into compatible units of measurement.

Weighting performs the second comparison by multiplying the scaled values of each indicator by a constant, unitless coefficient whose magnitude represents the importance of the indicator relative to other indicators. This is necessary, because some indicators are believed to be more important than others, contributing differently to each of the factors. E.g. among the "capacity" factor an early warning system is regarded more effective than the existence of an emergency plan. While this is certainly true for "predictable" floods, in case of "unpredictable" earthquakes early warning is much less effective. Therefore indicators enter into the indexing with a hazard-specific weighting.

The suggested weights for each indicator for an earthquake hazard are shown in table 11. They are subjective and based on descriptive literature, own experience and feedback of few practitioners. These weighting factors still need to be further validated and adjusted to county specific conditions. Weights for other hazards still have to be elaborated. One has to bear in mind that this is a subjective view of dependencies and interdependencies among the indicators and the risk factors.

Since all four factors are believed to contribute equally to the overall risk index the weights were chosen in a way, to allow each factor index to range between 0 and 100. This can be achieved in distributing a total of 33 weighting points (actually $33 \frac{1}{3}$) according to the believed importance of the indicators for each factor (table 12).

The Risk Index

As with the indicator weighting, the actual relationship between the factors cannot be determined statistically. Following the approach of Davidson (1997) a linear relationship is assumed being reasonable and easy to understand and implement. For the single composite risk index, the contribution of each factor is believed to be equal. While increasing scores of the factors Hazard, Exposure and Vulnerability represent an increasing disaster risk, the factor Capacity & Measures reduces the disaster risk.

Table 11: Hazard specific Indicator Weights

Main Factor	Indicator Name	Weight Value
		Earthquake ¹⁹
HAZARD		
	(H1)/(H2) Occurrence (experienced/ possible hazardous events)	20
	(H3)/(H4) Intensity (experienced/ possible hazardous events)	13
EXPOSURE		
	(E1) Number of housing units	7
	(E2) Lifelines	6
	(E3) Total resident population	10
	(E4) Local gross domestic product	10
VULNERABILITY		
	(V1) Density	3
	(V2) Demographic pressure	3
	(V3) Unsafe settlements	1
	(V4) Access to basic services	1
	(V5) Poverty level	2
	(V6) Literacy rate	2
	(V7) Attitude	3
	(V8) Decentralization	1
	(V9) Community participation	2
	(V10) Local resource base	3
	(V11) Diversification	2
	(V12) Stability	2
	(V13) Accessibility	2
	(V14) Area under forest	2
	(V15) Degraded land	2
	(V16) Overused land	2
CAPACITY & MEASURES		
	(C1) Land use planning	2
	(C2) Building codes	2
	(C3) Retrofitting/ Maintenance	1
	(C4) Preventive structures	1
	(C5) Environmental management	1
	(C6) Public awareness programs	2
	(C7) School curricula	2
	(C8) Emergency response drills	1
	(C9) Public participation	2
	(C10) Local risk management groups	2
	(C11) Local emergency funds	1
	(C12) Access to national funds	1
	(C13) Access to intl. emergency funds	1
	(C14) Insurance market	1
	(C15) Mitigation loans	1
	(C16) Reconstruction loans	1
	(C17) Public works	1
	(C18) Risk management committee	2
	(C19) Risk map	1
	(C20) Emergency plan	2
	(C21) Early warning system	2

¹⁹ Weights for other hazards (volcano, landslide, flood, hurricane and drought) still have to be elaborated.

(C22) Institutional capacity building	2
(C23) Communication	1

Table 12: Example Earthquake Risk Index Villa Canales, Guatemala

Main Factor	Indicator Name	Earthquake weight	Scaled indicator value	Factor Scores
HAZARD		33		59
	(H1)/(H2) Occurrence (experienced/possible hazardous event)	20	1	20
	(H3)/(H4) Intensity (experienced/possible hazardous event)	13	3	39
EXPOSURE		33		52
	(E1) Number of housing units	7	2	14
	(E2) Lifelines	6	3	18
	(E3) Total resident population	10	1	10
	(E4) Local gross domestic product	10	1	10
VULNERABILITY		33		67
	(V1) Density	3	2	6
	(V2) Demographic pressure	3	2	6
	(V3) Unsafe settlements	1	2	2
	(V4) Access to basic services	1	2	2
	(V5) Poverty level	2	3	6
	(V6) Literacy rate	2	1	2
	(V7) Attitude	3	2	6
	(V8) Decentralization	1	2	2
	(V9) Community participation	2	3	6
	(V10) Local resource base	3	1	3
	(V11) Diversification	2	3	6
	(V12) Stability	2	3	6
	(V13) Accessibility	2	2	4
	(V14) Area under forest	2	3	6
	(V15) Degraded land	2	1	2
	(V16) Overused land	2	1	2
CAPACITY & MEASURES		33		30
	(C1) Land use planning	2	0	0
	(C2) Building codes	2	1	1
	(C3) Retrofitting/ Maintenance	1	1	1
	(C4) Preventive structures	1	1	1
	(C5) Environmental management	1	1	1
	(C6) Public awareness programs	2	2	4
	(C7) School curricula	2	3	6
	(C8) Emergency response drills	1	2	2
	(C9) Public participation	2	3	6
	(C10) Local risk management groups	2	1	2
	(C11) Local emergency funds	1	0	0
	(C12) Access to national funds	1	0	0
	(C13) Access to intl. emergency funds	1	1	1
	(C14) Insurance market	1	1	1
	(C15) Mitigation loans	1	0	0
	(C16) Reconstruction loans	1	0	0
	(C17) Public works	1	0	0
	(C18) Risk management committee	2	1	2
	(C19) Risk map	1	0	0
	(C20) Emergency plan	2	0	0

(C21) Early warning system	2	0	0
(C22) Institutional capacity building	2	0	0
(C23) Communication	1	2	2

Using the liner relationship, it is suggested to add up the factor scores Hazard, Exposure and Vulnerability and deduct the factor score of Capacity & Measures. To use the same scale between 0 and 100 as the individual factor indices do, a uniform weight of 0.33 for all factors is introduced. This way the overall risk index R can never exceed 100 and reasonably not get negative²⁰.

Expressed as equation:

$$R = (wHH + wEE + wVV) - wCC$$

Where:

R is the overall risk index,

H, E, V and C are the scores of the Hazard, Exposure, Vulnerability and Capacity & Measures indices, respectively, and

wi is the constant coefficient of 0.33 as a uniform weight to all factors.

Index Presentation and Interpretation

The overall risk index tells us about the risk and the identified risk determining factors of communities. It allows:

1. To compare different communities across the country to identify communities with high disaster risk for targeting. This can also be done for communities that face risk from different hazards.
2. To recognize for each community what are the determining factors behind the existing risk. That is, whether the risk stems from the hazard itself (hazard), is due to elevated vulnerability levels (vulnerability) or comes from a lack of capacity (capacity & measures).
3. To distinguish the different possible magnitudes of damages through the Exposure score.
4. To reveal deficits in the risk management capacities and potential areas for interventions through a breakdown of the Capacity & Measure score into the factor components.

Single Community

The calculation of the factor scores and risk index of a single commune is based on the results of the questionnaire and the assumed hazard specific weights. Table 12 shows how the computation is performed using the commune of Villa Canales as one of the investigated case communities.

Directly derived from table 12 the following Factor Scores were computed: Hazard: 53, Exposure: 56, Vulnerability: 666, Capacity & Measures: 28.

The overall risk index (in our case for earthquake only) is then calculated:

$$R = (wHH + wEE + wVV) - wCC$$

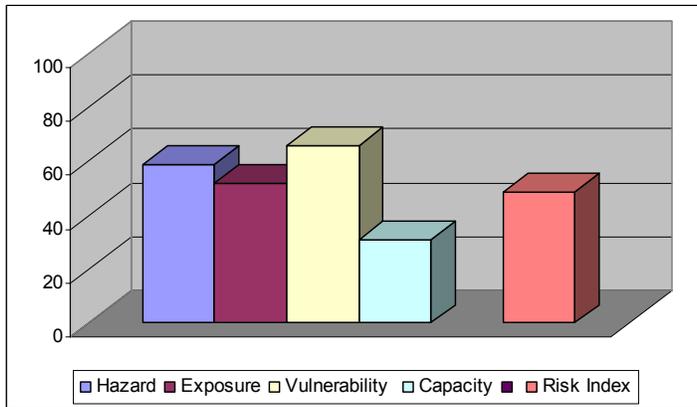
$$R = (0.33*59 + 0.33*52 + 0.33*67) - 0.33*30$$

$$R = 48,84$$

Graph 2 shows how these figures can be visualized for easy presentation and interpretation.

²⁰ Be careful when summing up indexes calculated for different hazards due to the fact that some values can be double counted if hazards are interrelated.

Graph 5. Factor Scores and Risk Index in Villa Canales, Guatemala



While the hazard and exposure scores show medium values, an elevated vulnerability score can be observed. With only little capacities & measures in place the related score is low and can not substantially reduce the risk index, which signals therefore a medium overall earthquake risk for Villa Canales.

Since Villa Canales faces multiple hazards, the procedure needs to be repeated with the other natural threats present. The overall risk would add up the different

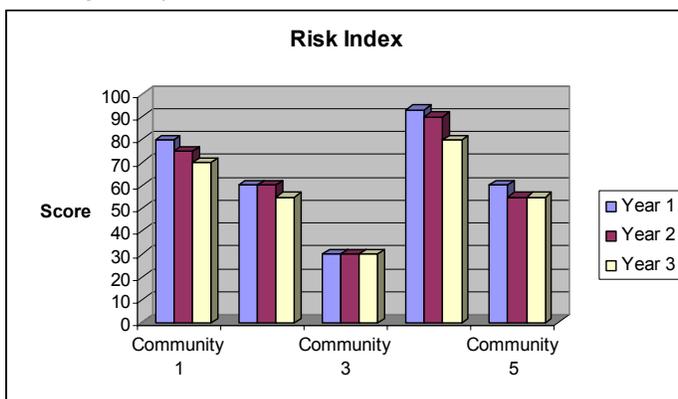
hazard specific risk indices to a summary index that can be used to directly compare various communities facing different hazards.

Direct Comparison

Through the scaling of factors into comparable scores, communities can be compared directly over time and across different hazards.

Graph 6 Direct Comparison of Communities over Time

For a given year various communities can be directly compared. Community 1 has a risk index of 80

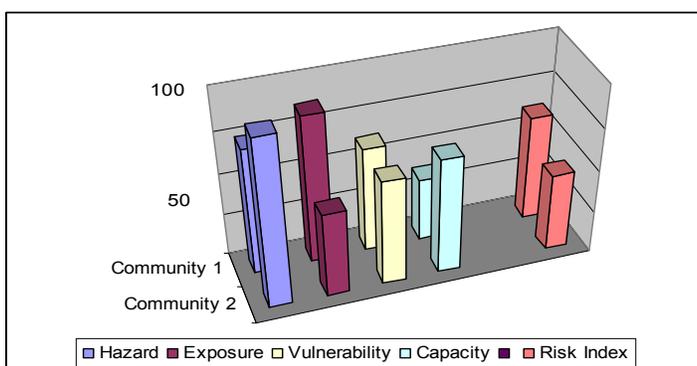


(year 1) that characterizes this community as much higher exposed to disaster as e.g. community 3 with an index of only 30.

If we focus on one community over various years one can also monitor progress towards a reduction of risk. While community 1 has reached a reduction over the years from an Index of 80 down to 70, community 3 stagnated at a very low level.

Factor Breakdown

The score of each factor gives us insight into the composition of the disaster risk. One has to be aware that it is an unproven hypothesis, that each of the factors contribute with an equal weight to the overall risk. However, a comparison across the communities can properly identify which communities are under a higher hazard threat, face larger damages and are more vulnerable, or whether there is room to increase the capacities to withstand disasters.



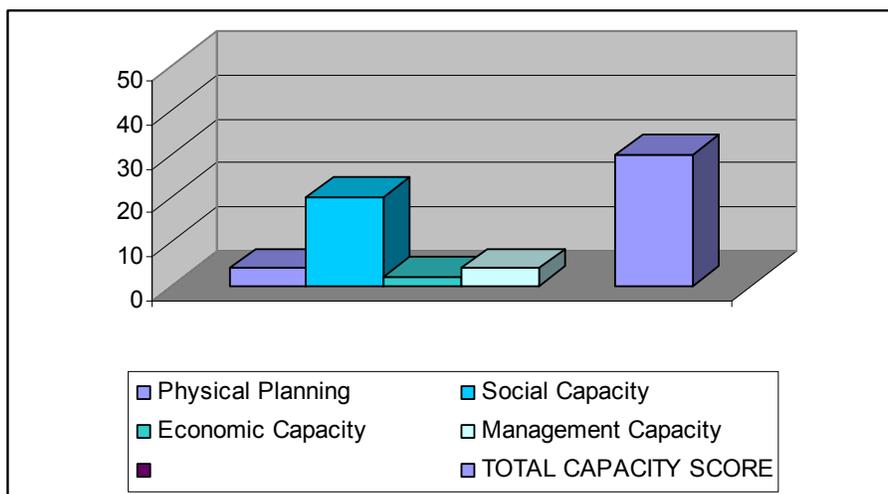
Graph 7. Risk Index Comparison (Factor Breakdown) Between Two Communities

The first community has a lower Hazard risk but also a very low Capacity compared to the second community. This explains the overall higher risk index of the first community. The Exposure score indicates also much higher values are at stake for this community. The existing Vulnerabilities are about the same.

Capacity Component Breakdown

The capacity component breakdown reveals what intervention areas might be the most deficient ones. Again, for the selective representation of each component further assessment steps are necessary to actually plan interventions. The scores can only give hints.

Graph 8 Capacity Component Breakdown for a Single Community



Assuming a proper weighting of the different indicators used to assess the four components of capacity, a major deficits can be identified in the physical planning component, the economic capacity, and the management and institutional capacity, while societal aspects can be considered as strong.

Application and Validation

The index summarizes a great deal of disparate information to facilitate comparison of the magnitude and nature of disaster risk in Latin America in a way that is easily accessible to potential users. However, there is currently no convincing methodology to the conceptual problem on how to come to proper weights giving each indicator the right contributing share. Similarly, the relationship between hazard, exposure, vulnerability and capacity is not known. How much risk reducing effect do what capacities have? However, it is believed that the preliminary assumptions for the weights made and the linear equation proposed are sensible and backed by expert knowledge. And it is also believed that, although not scientifically verified, the resulting scoring system is a sensible step towards an analysis and interpretation that gives a better guidance to the local level than purely presenting the individual indicator values.

As long as the assumptions and techniques that guide the combination are explicit and clear, the user can interpret the combination based on his/her belief in the appropriateness of the approach. Furthermore, since the indicators that comprise the indices are presented as well as the risk index itself, the user can always refer to the indicator values themselves, and disregard the final risk index if he wishes.

As mentioned earlier, the presented approach is not yet operational. Additional work is needed to finalize the model and confirm the scaling and weights.

To this end the indexing system needs to be tested and verified on a number of cases to:

- Adjust the system by modifying the factors according to different hazards
- Adjust the scoring system to actual conditions
- Assess the strength of indicating possible areas of interventions

It would be also functional to develop a simple software package that takes the raw data of the questionnaire for each community as input, performs the scaling and weighting, and produces the final tables and figures as output. It also could offer the possibility to add or modify indicators and their cut-off points and allow to adjust the choice of the used weight values, to fit the model for specific country settings. Such a software tool could make the application of the whole method easy for any potential user to assess even a great number of communities.

MAIN FINDINGS OF THE CASE STUDIES

Case study analysis were carried out for Guatemala and Switzerland to learn about existing approaches on communal disaster risk management, to test the applicability of the indicator system and to illustrate its feasibility and the usefulness of the results²¹.

Switzerland has a highly decentralized structure with the responsibility of risk management delegated to autonomous communities. Standards and procedures are regulated by national laws and guidelines. A mandatory insurance system protects against losses. Enforcement of the procedures and resulting measures is guaranteed through laws governing regional and land use planning.

All risk management is based on mandatory hazard maps and optional risk and protection deficit maps. Factors taken into consideration are the characteristics of the hazard (probability and intensity) and the physical structures with their respective values. Environmental considerations play an important role, since forests have a strong protective function. In Switzerland other aspects such as social, economic, institutional or political vulnerabilities do not show marked deficits in their manifestation and are therefore of much less importance as in developing countries.

For *Guatemala*, and this is the case for most of the Latin American countries, risk management is a rather new policy area. The structures and policies in place in Guatemala are centralized and have achieved good results in preparedness and emergency response. There is little integration of commune and local levels.

Other areas of risk management namely prevention, mitigation and rehabilitation and reconstruction are still in their infancy. This is also due to a lack of assessment methods for vulnerability and risk. While there are some pilot projects initiated from different parties, including government and NGOs, there is no systematic approach or validation of methodologies that could lead to proper identification of hazards and vulnerabilities and subsequently to a systematic implementation of risk reducing measures. Under this perspective the presented indicator system offers a well-structured initial approach to disaster risk that can orient further studies for intervention planning on commune or local level.

Where before detailed and thus costly case by case analysis led to location specific knowledge of risk within a commune, the indicators system can be used as a cost and time efficient initial approach to gain a countrywide overview over disaster risk at communities (municipalities), vulnerability levels and lack of capacities.

²¹ The results are shown at the GTZ-web page (see note 1, p. 2)

Main conclusions that can be drawn from a comparison of the country case studies are:

- The importance of a normative and validated approach to assess risk that also leads to the identification of proper interventions.
- The positive impact of a regulatory legal framework that covers risk management as part of a general development effort making it a mandatory part e.g. for regional and land use planning.
- An understanding that disasters can only be dealt with using a comprehensive risk management approach that comprises prevention, mitigation, preparation, response and rehabilitation and reconstruction.

In both case studies it can be observed, that only a very limited number of indicators is used to feed into the establishment of hazard maps or serve to identify vulnerabilities. They are mostly intensity and probability figures for the description of hazards and physical/material vulnerabilities.

The application of the proposed indicator system on commune level showed that most of the data is available and that a comprehensive picture of the risk situation can be achieved. The application of the questionnaire is easy, fast and cost effective, which makes it suitable also for a countrywide use.

While this is seen as a very efficient approach for Guatemala, Switzerland went already beyond the need for such an initial and rapid method. Switzerland already has implemented a more narrow but in-depth system that not only identifies hazards on a commune wide level but also marks specific areas on a detailed map where a natural event poses a threat. Most of the responsibilities of risk management are with the autonomous communities. With the high values at stake, all necessary measures are taken to protect the population and public infrastructure under cost benefit considerations. Avoiding future damages is seen as an investment and with sufficient own funds on commune level the investments are made. Local land use planning and building codes also oblige the private sector to make provisions against risk. In addition a functioning insurance system protects against losses.

CONCLUSIONS

The proposed indicator system provides an efficient methodology on community and local level to generate information-guiding decision-makers to manage risks of natural hazards. It is an instrument that improves the capacity of communities and local governments to measure key elements of their current disaster risk and also to monitor progress towards risk reduction.

The approach to use a comprehensive indicator system for that task is new and promising. The application in various communities in two countries has shown that an indicator system based on a clear conceptual framework offers a unique way to bring the many components and relationships of disaster risk together to reveal the big picture.

Applying the indicator system creates risk awareness among the involved actors within the commune. The results give communities a structured insight into the driving forces behind the disaster risk they are facing, answering the key questions of:

- What is the threat? Hazards
- What is at stake? Exposure
- What are the weaknesses? Vulnerability
- What are the strengths and possibilities? Capacity & Measures

It is a very cost efficient way of an initial risk analysis that can guide complementary in-depth studies for implementation planning. Repetitive application of the indicator system over time will allow a monitoring of the changes towards disaster risk reduction.

Since the system can be applied rapidly and with little cost to a large number of communities it is also a useful tool for the national level to identify especially risk exposed communities. National funds can then be targeted accordingly. Also it becomes possible to evaluate national policies and investments in risk reduction by comparing progress in indicator achievement over time and across communities.

The inherent problem of an indicator-based approach is the right choice of indicators. The complex reality is reduced to what are believed the key aspects, which are then captured with few selected indicators. Although the work has placed great care in that process, only the application in different geographical and cultural contexts can validate the appropriateness of the indicators. To this end existing risk management projects and programs can be very instrumental.

The suggested development of a risk index would synthesize and summarize the individual information of the indicators into easy to interpret factor scores. Indexing would also allow to directly compare different communities among each other, even if they are threatened by different hazards.

REFERENCES

- Ahmad, Ehtisham and Baer, Katherine (1997).** "Colombia". Teresa Ter-Minassian, editor. *Fiscal Federalism in Theory and Practice*. Washington, D.C., United States: International Monetary Fund (IMF).
- Albala-Bertrand, J.M. (2002).** *Urban Disasters and Globalization*. Available: http://www.proventionconsortium.org/files/conference_papers/albalabertrand.pdf.
- Albala-Bertrand, J.M. (1993).** *Political Economy of Large Natural Disasters*. Oxford, United Kingdom: Clarendon Press.
- Alesch et al. (1993).** "Earthquake risk reduction and small businesses". K.L. Tierney and J.M. Nigg, editor. *Proceedings 1993 Nat. Earthquake Conf. Monograph 5: socioeconomic impacts*. Memphis, Tennessee, United States: Central United States Earthquake Consortium, 133–160.
- Alvarado, Carlos and Anzellini, Stefano (2002).** *Programa de Evaluación y Fortalecimiento del Tema de Prevención y Mitigación de Riesgos en los Planes de Ordenamiento Territorial en Colombia*. Bogotá, Colombia: Corporación Andina de Desarrollo (CAF), Ministerio de Desarrollo.
- 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, Disposable: http://econ.worldbank.org/files/23420_wps2963.pdf.
- Barahona, Juan Carlos; Doryan, Eduardo; Sachs, Jeffery, and Larrain, Felipe (1999).** *Facing Natural Disasters in a Vulnerable Region: Hurricane Mitch in Central America (Lessons Learned)*. Disposable: <http://www.incae.ac.cr/ES/clacds/investigacion/pdf/cen1100a.pdf>
- Bartone, Carl R. (2001).** "The Role of the Private Sector in Municipal Solid Waste Service Delivery Developing Countries: Keys to Success". In: Mila Freire and Richard Stren, editor. *The Challenge of Urban Government, Policies and Practices*. Washington, D.C., United States: World Banc.
- Benson, Charlotte and Clay, Edward (2000).** "Developing Countries and the Economic Impacts of Natural Disasters". Alcira Kreimer and Margaret Arnold, editor. *Managing Disaster Risk in Emerging Economies*. Washington D.C., United States: World Banc.
- Benson, Charlotte, Clay, Edward; Michael, Franklyn V., and Robertson, Alastair W. (2001).** *Dominica: Natural Disasters and Economic Development in a Small Island State*. Washington D.C., United States: World Banc. Disaster Risk Management Working Paper Series No. 2.
- Benson, Charlotte; Twigg, John, and Myers, Mary (2001).** "NGO Initiatives in Risk Reduction: An Overview". *Disasters*. vol. 25/3: 199–215.
- Bethke, Lynne; Good, James, and Thompson, Paul (1997).** *Building capacities for risk reduction*. first edition. Without country of publication: UN-DMTP. Available: www.undmtp.org.
- Bird, Richard (2001).** *Intergovernmental Fiscal Relations in Latin America: Policy Design and Policy Outcomes*. Washington, D.C., United States: IDB.
- Blaikie, P.; Cannon, T.; Davis, I., and Wisner, B. (1994).** *At Risk. Natural Hazard, People's Vulnerability and Disasters*. London and New York.
- Bollin, Christina (2003).** *Gestión local de Riesgo. Experiencias de América Central*. Eschborn, Deutschland: GTZ.
- Brennan, Tom (2001).** Untitled. Available: http://www.hyogo.uncrd.or.jp/ws2001/proceedings/ws_cdrom/6_symposium/6-4_panel3/6-4-2_brennan/brennan.pdf.
- Brown, Warren and Nagarajan, Geeta (2000).** *Bangladeshi Experience in Adapting Financial Services to Cope with Floods, Implications for the Microfinance Industry*. Microenterprise Best practices. Washington, D.C.: USAID and DAI. Available: <http://www.mip.org>.
- Buckle, Philip (1999).** "Re-defining Community and Vulnerability in the Context of Emergency Management." *Australian Journal of Emergency Management* (Summer): 21–26.
- Burki, Shahid, Perry, Guillermo and Dillinger, William (1999).** *Beyond the Center: Decentralizing the State*. Washington D.C., United States: World Bank Latin America and Caribbean Studies.
- Campbell, Tim (1997).** *Innovations and Risk Taking, The Engine of Reform in Local Government in Latin America and the Caribbean*. Washington, D.C., United States: World Banc.

- Campbell, Tim, et al. (1991).** *Decentralization to Local Government in Latin America and the Caribbean: National Strategies and Local Response in Planning, Spending, and Management.* Washington, D.C., United States: World Banc.
- Cárdenas, Camilo (1999).** *El Sistema Nacional para la Prevención y Atención de Desastres de Colombia en el Contexto Latinoamericano.* Conference in Paris, France. Photocopied document.
- Cárdenas, Camilo (2000).** *Evolución y Perspectivas del tratamiento de los Riesgos Socio naturales en Colombia.* Bogotá, Colombia: Sociedad Geográfica de Colombia, Bulletin No. 130.
- Cárdenas, Camilo (2001).** *La Prevención de Riesgos Ambientales en América Latina y en particular en Colombia.* Taller: Manejo del Riesgo Ambiental: Memorias. Quito. Ecuador. Photocopied document.
- Charvériat, Céline (2000).** *Natural disasters in Latin America and the Caribbean: An Overview of Risk.* Washington D.C.: IDB, Research Department Working Papers Series No. 434.
- Comisión Económica para América Latina y el Caribe, CEPAL (1999).** *Nicaragua. Evaluación de los daños ocasionados por el huracán Mitch, 1998. Sus implicaciones para el desarrollo económico y social y el medio ambiente.* Disponible: <http://www.eclac.cl>
- Comisión Económica para América Latina y el Caribe, CEPAL (1999).** *Nicaragua. Evaluación de los daños ocasionados por el huracán Mitch, 1998. Sus implicaciones para el desarrollo económico y social y el medio ambiente.* Available: <http://www.eclac.cl>
- Comisión Económica para América Latina y el Caribe, CEPAL, y Programa de las Naciones Unidas para el Desarrollo, PNUD (2002).** *Financing for Sustainable Development in Latin America and the Caribbean, From Monterrey to Johannesburg.* World Summit on Sustainable Development, Johannesburg. Available: <http://www.eclac.cl/publicaciones/MedioAmbiente/8/LCR2098I/lcr2098i.pdf>.
- Davidson, R. (1998).** *Evaluation and Use of the Earthquake Disaster Risk Index.* Oakland, California: Proceedings, 6th U.S. Nat. Conf. on Earthquake Engineering, Earthquake Engineering Research Institute.
- Davidson, R. and Lambert, K. (2001).** "Comparing the Hurricane Disaster Risk of U.S. Coastal Counties". *Natural Hazards Review.* August 2001: 132–142.
- Departamento Nacional de Planeación, DNP (2001).** *Estrategia para Consolidar la Ejecución del Plan Nacional para la Prevención y Atención de Desastres –PNPAD– en el corto y mediano plazo.* Bogotá, Colombia: Consejo Nacional de Política Económica y Social.
- Dillinger, William. (1994).** *Decentralization and its Implications for Service Delivery.* Washington, D.C., United States: World Banc. Urban Management Programme Discussion Paper, No. 6.
- Dirección Nacional para la Prevención y Atención de Desastres, Ministerio del Interior (1998).** *Plan Nacional para la Prevención y Atención de Desastres. Decreto No. 93 de 1998.* Bogotá, Colombia.
- Durán Vargas and Luis Rolando (2002).** *Análisis de Estado de Situación de Sistemas Nacionales y Avances de Implementación del Marco Estratégico para la Reducción de las Vulnerabilidades y el Impacto de los Desastres.* San José, Costa Rica: CEPREDENAC, IDB.
- Ebel, Robert D. and Vaillancourt, François (2001).** "Fiscal Decentralization and Financing Urban Governments: Framing the Problem". Mila Freire and Richard Stren, editor. *The Challenge of Urban Government, Policies and Practices.* Washington, D.C., United States: World Banc.
- Emergency Management Australia (1999).** *Australian Emergency Risk management, Applications Guide.* Australian Emergency Manuals Series, Part II, Approaches to Emergency Management, Volume I - Risk Management Manual 1. Disponible: <http://www.ema.gov.au>
- Estrategia Internacional para la Reducción de Desastres Naturales, EIRD. EIRD Informa –** América Latina y Caribe. Monthly edition. Disponible: www.eird.org.
- Estrategia Internacional para la Reducción de Desastres Naturales, EIRD (2001).** *Tendencias sobre Reducción de Desastres en las Américas.* Conferencia Hemisférica para la Reducción de Riesgos. San José, Costa Rica.
- Faguet, Jean-Paul (2000).** *Does Decentralization Increase Responsiveness to Local Needs? Evidence from Bolivia.* Available: <http://www1.worldbank.org/publicsector/decentralization/wps2516.pdf>.

Fernández, María Augusta (1999). *Fortalecimiento Institucional al Sistema Nacional de Defensa Civil.* Quito, Ecuador: PNUD.

Freeman, Paul and Kunreuther, Howard (1997). *Managing Environmental Risk through Insurance.* Boston, Dordrecht and London: Kluwer Academic Publishers.

Freeman, Paul K.; Martin, Leslie A.; Linnerooth- Bayer, Joanne; Mechler, Reinhard; Saldana, Sergio; Warner, Koko and Pflug, Georg (2002). *Sistemas nacionales para la gestión de desastres: Financiamiento de la reconstrucción.* Washington D.C., United States: IDB.

Freeman, Paul K.; Martin, Leslie A.; Linnerooth- Bayer, Joanne; Warner, Koko; Lavell, Alan; Cardona, Omar D., and Kunreuther, Howard (2001). *Sistemas nacionales y mecanismos institucionales de manejo de riesgo de desastres. Documento de trabajo.* Washington D.C., United States: IDB.

Freeman, Paul K.; Martin, Leslie A.; Linnerooth- Bayer, Joanne; Mechler, Reinhard; Pflug, Georg, and Warner, Koko (2003). *Disaster Risk Management.* Washington D.C., United States: IDB.

Garatwa, Wolfgang and Bollin, Christina (2002). *Gestión de Riesgo. Concepto de trabajo.* Eschborn, Deutschland: GTZ.

Gellert, Gisela (1997). *Evaluación de las Experiencias Nacionales en la Prevención de Desastres Naturales: Lecciones Aprendidas en Guatemala.* Guatemala City, Guatemala: GTZ. Proyecto Fortalecimiento de Estructuras Locales para la Mitigación de Desastres, FEMID.

Gilbert, Roy and Kreimer, Alcira (1999). *Learning from the World Bank's Experience of Natural Disaster Related Assistance.* Washington D.C., United States: World Banc. Disaster Management Facility.

Inter-American Development Bank, IDB (2001a). *Fiscal Decentralization: Issues and Challenges.* Washington D.C., United States.

Inter-American Development Bank, IDB (2001b). *Consideraciones para la Reconstrucción.* Reunión del Grupo Consultivo para la Reconstrucción de El Salvador. Available: <http://www.iadb.org/exr/events/Reconst.PDF>.

Inter-American Development Bank, IDB (2001c). *Informe Anual sobre el Desarrollo de Micro Empresas. Departamento de Desarrollo Sostenible. Micro, Pequeña y Mediana Empresa.* Washington, D.C., United States. Available: <http://www.iadb.org/sds/doc/AnnualReport2000Eng.pdf>

Inter-American Development Bank, IDB (2000a). *Protección Social para la Equidad y el Crecimiento.* Washington, D.C., United States.

Inter-American Development Bank, IDB (2000). *El Desafío de Desastres Naturales en América Latina y el Caribe. Plan de Acción del BID.* Washington D.C., United States.

Inter-American Development Bank, IDB (1997). *Latin America after a Decade of Reforms: Economic and Social Progress.* (Distribution: Johns Hopkins University Press with the Inter-American Development Bank).

International Federation of Red Cross and Red Crescent Societies, IFRC (2002). *World Disasters Report. Focus on reducing risk.* Geneva, Switzerland.

International Strategy for Disaster Reduction, ISDR (2002). *Living with Risk. A global review of disaster reduction initiatives.* Preliminary version. Geneva, Switzerland.

Kuban, Ron Heather and MacKenzie, Carey (2001). *From Community-wide Vulnerability and Capacity Assessment (CVCA).* Canada: Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP).

Jørgensen. Steen Lau and Van Domelen, Julie (2001). "Helping the Poor Manage Risk Better: The Role of Social Funds". Lustig, Nora, editor. *Shielding the Poor: Social Protection in Developing Countries.* Washington, D.C., United States. Brookings Institution and IDB.

Keipi, Kari and Tyson, Justin (2002). *Planificación y Protección Financiera para Sobrevivir Desastres.* Washington, D.C., United States: IDB. Sustainable Development Department. Technical Paper Series.

- Kleindorfer, P. R. and Kunreuther, H. C. (1999).** “Challenges Facing the Insurance Industry in Managing Catastrophic Risks”. Froot, K.A., editor. *The Financing of Catastrophe Risk*. Chicago, United States: University of Chicago Press: 149–189.
- Kreimer, Alcira et al. (1999).** *Managing Disaster Risk in Mexico: Market Incentives for Mitigation Investment*. Washington D.C., United States: World Banc. Disaster Risk Management Series 1.
- Laurie Johnson (2000).** *Kobe and Northridge Reconstruction, A Look at Outcomes of Varying Public and Private Housing Reconstruction Financing*. Non-published, presented at the Conference on Global Change and Catastrophic Risk Management: Earthquake Risks in Europe. Available: http://www.iiasa.ac.at/Research/RMS/july2000/Papers/johnson_housing0401.pdf
- Lavell, Allan, compilador (1997).** *Viviendo en riesgo. Comunidades vulnerables y prevención de desastres en América Latina*. N place of publication: Red de Estudios Sociales en Prevención de Desastres en América Latina. Available: www.desenredando.org.
- Lavell, Allan (2000).** “Desastres y Desarrollo: Hacia un Entendimiento de las Formas de Construcción Social de un Desastre: El Caso del Huracán Mitch en Centroamérica”. IDB/CIDHS, editor. *Del Desastre al Desarrollo Sostenible: El Caso de Mitch en Centroamérica*. San José, Costa Rica.
- Lavell, Allan (2001).** *Sobre la Gestión del Riesgo: Apuntes hacia una Definición*. Photocopied document.
- Lavell, Allan (2002):** *Proyecto CEPREDENAC-PNUD sobre Gestión de Riesgo en Centroamérica*. First concept, non-published.
- Litvack, Jennie and Seddon, Jessica, editor (1999).** *Decentralization Briefing Notes*. Washington, D.C., United States: World Banc.
- Litvack, Jennie (1999).** “Decentralization of Safety Nets”. Jennie Litvack and Jessica Seddon, editor. *Decentralization Briefing Notes*. Washington, D.C., United States: World Banc.
- Litvack, Jennie, Ahmad, Junaid and Bird, Richard (1998).** *Rethinking Decentralization in Developing Countries*. Washington, D.C., United States: World Banc. Sector Studies Series, Poverty Reduction and Economic Management.
- Lustig, Nora, editor (2001).** *Shielding the Poor: Social Protection in Developing Countries*. Washington, D.C., United States: Brookings Institution and IDB.
- Mackenzie, G.A. and Ruiz, José-Luis (1997).** “Bolivia”. Teresa Ter-Minassian, editor: *Fiscal Federalism in Theory and Practice*. Washington, D.C., United States: International Monetary Fund (IMF).
- Mansilla, Elizabeth, editor (1996).** *Guía para la Gestión local de los Desastres en América Latina*. No place of publication: Red de Estudios Sociales en Prevención de Desastres en América Latina.
- Marco Estratégico para la Reducción de Vulnerabilidad y los Desastres en Centro América. Declaración de Guatemala II (1999).** Without country of publication: CEPREDENAC.
- Maskrey, Andrew (1997).** “Comunidad y Desastres en América Latina: Estrategias de intervención”. Allan Lavell, editor. *Viviendo en riesgo. Comunidades vulnerables y prevención de desastres en América Latina*. No place of publication: Red de Estudios Sociales en Prevención de Desastres en América Latina. Available: www.desenredando.org.: 14–38.
- Mitteldeutscher Rundfunk, MDR (2003).** *Millionenprogramm für die Landeshauptstadt*. MDR 16.01.2003. Available: www.mdr.de/nachrichten/sachsen/509043.html
- Nayar, Nina and Emrul Hasan, Faisal M. (1999).** “Microfinance Survives Bangladesh Floods”. *Economic and Political Weekly*, 34(14) April 3 1999: 801–803.
- O’Neill, Kathleen (sin año).** *Decentralization in Bolivia: Electoral Incentives and Outcomes*. Disponible: www.artsci.wustl.edu/~polisci/carey/psc4231/articles/ONeillchapter.pdf
- Peterson, George C. (1997).** *Decentralization in Latin America, Learning through Experience*. Washington, D.C., United States: World Banc.
- Pitt, Mark (2000).** *Relevance of Microfinance for Disaster Mitigation*. Non-published, presented at: PNUD and World Banc Conference “Disaster Risk Reduction for the Poor”, organized by PNUD and World Banc. Washington, D.C., United States: World Banc.
- Presidencia de la República (1987).** *Bases para la Elaboración del Plan Nacional de Atención de Emergencias*. Bogotá, Colombia.

- Quarantelli, E. L. (2002).** *Urban Vulnerability to Disasters in Developing Countries: Managing Risks*. ProVention.
- Reddy, Sanjay (1998).** *Social Funds in Developing Countries: Recent Experiences and Lessons*. New York, United States: UNICEF.
- Ribot, Jesse C. (2001).** *Decentralized Natural Resource Management, Nature and Democratic Decentralization in sub-Saharan Africa*, Disposable: <http://lnweb18.worldbankorg/ESSD/essdext.nsf/15ByDocName/Publications>.
- Sánchez del Valle, Rosa (2002).** *Lecciones aprendidas en la Gestión Local de Riesgo*. Guatemala City, Guatemala: GTZ. Proyecto Fortalecimiento de Estructuras Locales para la Mitigación de Desastres (FEMID).
- SEGEPLAN (2002).** *Política de Desarrollo Social y Población*. Guatemala City, Guatemala. Non-published.
- SEGEPLAN (2001).** *Ley de Población y Desarrollo Social*. Guatemala City, Guatemala: Fondo de Población de United Nations (FNUAP). Non-published.
- Shah, Anwar (1999).** "Intergovernmental Transfers and Grants". Jennie Litvack and Jessica Seddon, editor. *Decentralization Briefing Notes*. Washington, D.C., United States. World Bank.
- Sistema Nacional para la Prevención, Mitigación y Atención de Desastres (2001).** Guayaquil, Ecuador: Unidad Coordinadora del Programa de Emergencia para el Fenómeno del Niño, COPEFEN, and PNUD.
- Smedler, Aase and Arenas, Ángeles (2001)** *Estrategias y Políticas de Reducción de Riesgos. Taller Manejo del Riesgo Ambiental. Memorias*. Quito. Ecuador: PNUD.
- Spahn, Paul Bernd and Föttinger, Wolfgang (1997).** "Germany". Teresa Ter-Minassian, editor: *Fiscal Federalism in Theory and Practice*. Washington, D.C., United States: International Monetary Fund (IMF).
- Stren, Richard (2002).** "Decentralization: False Start or New Dawn?" *Habitat Debate*. UN-HABITAT. March 2002. Vol. 8 No. 1.
- Stren, Richard (2001).** "Financial Management - Revenue Raising, Editor's Introduction". In: Mila Freire and Richard Stren, editor. *The Challenge of Urban Government, Policies and Practices*. Washington, D.C., United States: The World Banc Institute.
- Tierney, K. J. and Dahlhamer, J. M. (1998).** "Earthquake vulnerability and emergency preparedness among businesses." M. Shinozuka, A. Rose and R.T. Eguchi, editor. *Engineering and socioeconomic impacts of earthquakes*. Buffalo, United States: Multidisciplinary Center for Earthquake Engineering Research: 53–72.
- United Nations (1998).** *World Urbanization Prospects. The 1996 Revision*. (Department of Economic and Social Affairs, Population Division). New York: United Nations.
- Vargas, Jorge Enrique (2002).** *Políticas Públicas para la Reducción de la Vulnerabilidad frente a los Desastres Naturales y Socio-Naturales*. Santiago de Chile, Chile: CEPAL.
- Varangis, Panos (2001).** "Innovative Approaches to Cope with Weather Risk in Developing Countries". *The Climate Report*, Vol. 2, No. 4, 2001.
- Vatsa, Krishna and Krimgold, Frederick (2000).** "Financing Disaster Mitigation for the Poor". Alcira Kreimer and Margaret Arnold, editor. *Managing Disaster Risk in Emerging Economies*. Washington D.C., United States: World Banc.
- Vermeiren. Jan C. (2000).** "Risk Transfer and Finance Experience in the Caribbean". Alcira Kreimer and Margaret Arnold, editor. *Managing Disaster Risk in Emerging Economies*. Washington D.C., United States: World Banc.
- Vogel, Coleen (1997).** *Vulnerability and Global Environmental Change*. University of Witwatersrand, Johannesburg, NUCC Newsletter 3. Available: www.geo.ucl.ac.be/LUCC/publications/luccnews/news3/coleen.html
- Vries, Jaap de, Schuster, M., Procee, Paul, and Mengers, Harry (2001).** *Environmental Management of Small and Medium Sized Cities in Latin America and the Caribbean*. Washington, D.C., United States: IDB.

Wisner, Ben (2000). *Issues and Challenges in Vulnerability and Risk Indexing*. Non-published, presented at: "Expert Meeting on Vulnerability, Risk Analysis, and Indexing, 11.12 September 2000" Geneva, Switzerland: PNUD.

World Bank (2002). *Natural Hazard Risk Management in the Caribbean, Revisiting the Challenge*. Caribbean Group for Cooperation in Economic Development. Non-published.

World Bank (2001). *Decentralization*. Disposable: <http://inweb18.worldbank.org/essd/essdext.nsf/15ByDocName/ThemesandIssues>.

World Bank (1997). *World Development Report 1997: The State in a Changing World*. Oxford: Oxford University Press for the World Bank.

World Bank (1996). *Participation in Social Funds*. The World Bank Participation Source Book. Washington, D.C., United States.

World Food Programme, WFP (2001): *Guidelines for WFP Assistance to Disaster Mitigation*. 4th preliminary version. Without country of publication.

Zeller, Manfred (2001). "The Safety Net Role of Micro-Finance for Income and Consumption Smoothing." Nora Lustig, editor. *Shielding the Poor: Social Protection in Developing Countries*. Washington, D.C., United States: Brookings Institution and IDB.

Zentrum für Naturrisiken und Entwicklung, ZENEB (2002). *Bericht zum deutschen Beitrag für den World Vulnerability Report des United Nations Development Programme*. Bonn and Bayreuth, Deutschland.

LIST OF ACRONYMES

ADPC	Asian Disaster Preparedness Center
AIF	International Support Association (“Asociación Internacional de Fomento”)
AMUNIC	Municipality Association of Nicaragua (“Asociación de Municipios de Nicaragua”)
ASDI	Swedish Development and International Bilateral Cooperation Authority
BID	Inter-American Development Bank (“Banco Interamericano de Desarrollo”)
BUWAL	Federal Environment, Forest and Landscape Office, Switzerland (“Bundesamt für Umwelt, Wald und Landschaft“)
BZS	Federal Civil Protection Office, Switzerland (“Bundesamt für Zivilschutz“)
CDERA	Caribbean Disaster Emergency Response Agency
CENAT	Natural Hazard Competence Center, Switzerland (“Centre de Compétence Dangers Naturels“)
CEPRODE	Disaster Protection Center, El Salvador (“Centro de Protección para Desastres”)
CEPREDENAC	Central America Natural Disaster Reduction Coordination Center (“Centro de Coordinación para la Reducción de Desastres Naturales en América Central”)
CIDHS	Research Center for Human Rights and Judicial Assistance of Panama (“Centro de Investigación de los Derechos Humanos y Socorro Jurídico de Panamá”)
COLPADE	Local Disaster Prevention, Response and Recovery Committee, Colombia (“Comité Local de Prevención, Atención y Recuperación de Desastres”)
COMURES	Corporation of Municipalities of the Republic of El Salvador (“Corporación de Municipalidades de la República de El Salvador”)
CONARADE	National Disaster and Emergency Reduction and Response Council, Bolivia (“Concejo Nacional de Reducción y Atención de Desastres y Emergencias”)
CONRED	National Disaster Reduction Coordinator, Guatemala (“Coordinadora Nacional para la Reducción de Desastres”)
CONPES	National Economic and Social Policies Council, Colombia (“Consejo Nacional de Política Económica y Social”)
COSUDE	Agency for Development and Cooperation, Switzerland
CRID	Regional Disaster Information Center (“Centro Regional de Información sobre Desastres”)
DGPAD	General Disaster Prevention and Response Agency, Colombia (“Dirección General para la Prevención y Atención de Desastres”)
ECHO	European Commission Humanitarian Office
EIRD	Internacional Disaster Reduction Strategy
ECLAC	Economic Commission for Latin America and the Caribbean (“Comisión Económica para América Latina y el Caribe”)
EMIS	Emergency Management Information System, Philippines
FEMID	Local Structure Strengthening for Disaster Mitigation (“Fortalecimiento de Estructuras Locales para la Mitigación de Desastres”)
FONDEN	Natural Disaster Fund, México (“Fondo para Desastres Naturales”)
FOPAE	Emergency Prevention and Administration Fund of Bogotá (“Fondo para la Prevención y Administración de Emergencias de Bogotá”)
FORADE	Disaster Reduction and Administration Fund, Bolivia (“Fondo para la Reducción y Administración de Desastres”)
FOREC	Social Reconstruction and Development Fund for the Coffee-Planting Area, Colombia (“Fondo para la Reconstrucción y Desarrollo Social del Eje Cafetalero”)
GGRD	Piura Department Disaster Risk Management Group, Perú (“Grupo de Gestión de Riesgos de Desastres del Departamento de Piura”)
GOWN	Public Relations, Forests and Natural Hazards Group, Switzerland (“Gruppe für Öffentlichkeitsarbeit, Wald und Naturgefahren“)

GTZ	German Technical Cooperation Agency (“Deutsche Gesellschaft für Technische Zusammenarbeit”)
IDB	Inter-American Development Bank
IGN	National Geographic Institute, Guatemala (“Instituto Geográfico Nacional”)
INDECI	National Civil Defense Institute, Perú (“Instituto Nacional de Defensa Civil”)
INDRD	Internacional Natural Disaster Reduction Decade
INETER	Nicaraguan Institute of Territorial Studies (“Instituto Nicaragüense de Estudios Territoriales”)
INGEOMINAS	Geoscience, Mining and Chemistry Research Institute, Colombia (“Instituto de Investigaciones en Geociencias, Minería y Química”)
INIFOM	Nicaraguan Institute for Municipal Support (“Instituto Nicaragüense de Fomento Municipal”)
INSIVUMEH	Nacional Seismology, Vulcanology, Meteorology and Hidrology Institute, Guatemala (“Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología”)
ISDR	International Strategy for Disaster Reduction
LPP	Popular Participation Law, Bolivia (“Ley de Participación Popular”)
MAGA	Ministry of Agriculture, Livestock and Food, Guatemala (“Ministerio de Agricultura, Ganadería y Alimentación”)
NDCC	National Disaster Coordinating Council, Filipinas
NGO	Non-governmental Organization
OCDE	Economic Cooperation and Development Organization (“Organización de Cooperación y Desarrollo Económico”)
OAS	Organization of American States
OFDA	Office of United States Foreign Disaster Assistance
OMPAD	Municipal Disaster Prevention and Response Office, Colombia (“Oficina Municipal para la Prevención y Atención de Desastres”)
PAHO	Pan-American Health Organization
PDRN	Pampanga Disaster Response Network, Filipinas
PET	Temporal Work Program, Bolivia (“Programa de Empleo Temporal”)
PREANDINO	Regional Andean Risk Prevention and Mitigation Program (“Programa Regional Andino para la Prevención y Mitigación de Riesgos”)
PREDES	Disaster Studies and Prevention Center, Perú (“Centro de Estudios y Prevención de Desastres”)
SEGEPLAN	Plannification and Programming Secretariat of the Presidency, Guatemala (“Secretaría de Planificación y Programación de la Presidencia”)
SENA	National Learning Service, Colombia (“Servicio Nacional de Aprendizaje”)
SENADECI	National Civil Defense Service, Bolivia (“Servicio Nacional de Defensa Civil”)
SENAR	National Risk Reduction Service, Bolivia (“Servicio Nacional de Reducción de Riesgos”)
SIF	Social Investment Fund (“Fondo de Inversión Social”)
SISRADE	Disaster and Emergency Reduction and Response System, Bolivia (“Sistema de Reducción y Atención de Desastres y Emergencias”)
SNPMAD	National Disaster Prevention, Mitigation and Response System, Nicaragua (“Sistema Nacional para la Prevención, Mitigación y Atención a Desastres”)
TGN	National General Treasury, Bolivia (“Tesoro General de la Nación”)
UNDP	United Nations Development Program
UNICEF	United Nations Children’s Fund
UTOAF	Technical Operative Support and Strengthening Unit, Bolivia (“Unidad Técnica Operativa de Apoyo y Fortalecimiento”)

UVEK	Federal Environment, Transport, Energy and Communications Department, Switzerland (“Eidgenössisches Department für Umwelt, Verkehr, Energie und Kommunikation“)
VBS	Eidgenössisches Department für Verteidigung, Bevölkerungsschutz und Sport
WFP	World Food Programme