

EXECUTIVE SUMMARY

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Analysis of *Disaster Risk Management in Colombia*

A Contribution to the Creation
of Public Policies

Coordinators and Editors

Ana Campos G., Niels Holm-Nielsen, Carolina Díaz G., Diana M. Rubiano V., Carlos R. Costa P., Fernando Ramírez C. and Eric Dickson



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PREFACE

LIKE MANY COUNTRIES IN LATIN AMERICA, Colombia faces great challenges that seriously threaten its development. Factors such as population displacement from rural to urban areas, environmental degradation, and rapid changes in land use amplify these challenges. These socioeconomic conditions, together with the country's tendency to be affected by natural phenomena such as earthquakes, floods, and landslides, among others, aggravated by human activity and varying climate conditions, confirm a continuous construction process and risk accumulation. The materialization of these risks on disasters affects the country's development, obstructing and delaying the achievement of the social welfare goals set by the Government.

As a result of the immense losses caused by the La Niña phenomenon in 2010-2011, and within the scope of the agenda on disaster risk management that the World Bank has maintained since 1999 with the Colombian Government, the National Planning Department requested the support of this institution to conduct a comprehensive assessment of the risk management policies and make short- and long-term strategic recommendations to help reduce the disaster's impact on the population and the economy.

This is the first time that a Disaster Risk Management Analysis is carried out in Latin America within the context of development policies in a country where traditionally the Bank has conducted these types of studies from an environmental perspective or from the different sectors.

This report, which is not limited to analyzing the risk causes or measuring their growth, is the result of a joint effort with multiple public and private agents. It goes into depth in the institutional advances in risk management at different government levels, and explains how this issue has been incorporated in the territorial and sectoral public administration. Additionally, it indicates the immense opportunities to articulate disaster risk management in current planning, investment, monitoring and control instruments, and makes evident the need to define public and private responsibility as part of the strategy in reducing the State's fiscal vulnerability.

In summary, the study shows that if the country does not want stagnation in its economic growth due to more frequent losses and at a greater scale, a radical change is essential in development policies and in territorial and sectoral management practices. Therefore, this document defines a set of recommendations so that disaster risk management becomes a State policy, emphasizing that improving land use and land occupation conditions is a priority in reducing the impact of disasters.

We wish to express our gratitude on behalf of the World Bank to the Government of Colombia for the trust given to us in requesting that we carry out this study. Likewise, I am grateful to everyone who contributed in one way or another with their formulations and comments. Special thanks as well to the Global Facility for Disaster Reduction and Recovery (GFDRR) for their financial support in making this study possible.

I invite State authorities, responsible for policy and development processes, to incorporate the criteria for risk reduction in all their practices, to encourage the participation of those who have not traditionally been involved in this problem, and to technically and financially join the local and regional governments in creating new intervention strategies in order to build a country based on safety criteria in facing disaster risks.

GLORIA GRANDOLINI

Director for Mexico and Colombia

World Bank

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Analysis of Disaster Risk Management in Colombia: A Contribution to the Creation of Public Policies is the result of World Bank work started in March 2011 at the request of the Colombian government through the National Planning Department. Numerous entities and professionals interested in the subject participated and an important group of collaborators made possible the materialization of the current document. The team especially wishes to thank Gloria M. Grandolini (Country Director, Colombia and Mexico - World Bank), Ede Jorge Ijjasz-Vásquez (Sector Manager for the Sustainable Development Department for Latin America and the Caribbean Region - World Bank), Guang Zhe Chen (Sector Manager for Urban, Water and Sanitation, and Disaster Risk Management for Latin America and the Caribbean Region - World Bank), Geoffrey Bergen (Resident Representative in Colombia - World Bank) and Daniel Sellen (Sector Manager for the Sustainable Development Department for Colombia - World Bank) for their unconditional support.

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(MVCT); Agriculture and Rural Development (MADR); Transportation (MT); Mines and Energy (MME); Health and Social Protection (MSPS); Finance and Public Credit (MHCP); and National Education (MEN), helped the team to carry out the present study. In addition, entities such as the Colombian Geological Survey (SGC); the Colombian Institute of Hydrology, Meteorology, and Environmental Studies (Ideam); the Colombian Ocean Commission (CCO); the National Statistics Department (DANE), and the Agustín Codazzi Geographic Institute (IGAC), offered fundamental contributions in preparing the study and actively participated in its review. It is important to mention the contribution of some officials of these institutions and other entities: Hernando José Gómez Restrepo (DNP), Mauricio Santa María Salamanca (DNP), Juan Mauricio Ramírez Cortés (DNP), Carolina Urrutia Vásquez (DNP, from July 2011), Giampiero Renzoni Rojas (DNP, up to July 2011), Alexander Martínez Montero (DNP), Nilson Correa Bedoya (DNP), Claudia Patricia Satizabal Robayo (DNP), María Salomé Ruíz Alvarado (DNP), Jean Philippe Penning (DNP), Pedro Luis Jiménez (DNP), José Alejandro Bayona (DNP), Augusto César Pinto (DNP), Nicolás Pérez Marulanda (DNP), Samuel Zambrano (DNP), Camilo Jaramillo (DNP), Katty De Oro (DNP), Julio César Jiménez (DNP), Carlos Iván Márquez Pérez (UNGRD), Richard Alberto Vargas Hernández (UNGRD), Perla Haydee Rueda (UNGRD), Jairo Enrique Bárcenas Sandoval (UNGRD), Marta Lucía Calvache Velasco (SGC), María Mónica Arcila Rivera (SGC), María Luisa Monsalve Bustamante (SGC), Iván Darío Gómez (IGAC), Camila Romero Chica (CCO), Ricardo Lozano (Ideam), Ernesto Rangel Mantilla (Ideam), Omar Franco (Ideam), Claudia Milena Álvarez Londoño (Ideam), Dorotea Cardona Hernández (Ideam), María Constanza García (MT), Gloria Sánchez (MT), Juan Camilo Granados (MT), Carla Viviescas (MT), Magda Constanza Buitrago Ríos (MT), Lyda Milena Esquivel Roa (Invías), Carlos Castaño (MADS), Luis Alfonso Sierra (MADS), Javier Pava (MADS), Luis Roberto Chiappe (MADS), Claudia Lucía Ramírez (MVCT), Carlos Ariel Cortés (MVCT), Claudia Mora (ex-Water Viceminister), Augusto Ardila (MSPS), Luis Eduardo Arango (MHCP), Sandra Rodríguez (MHCP), Lina Marcela Tami (MADR), Samira Alkhatib (MADR), Elizabeth Arciniegas (MADR), Eudes de Jesús Velásquez (MADR), Juan Carlos Ortega (Agrarian Bank), Mara Bigitthe Bravo (MEN), Dinora Carolina Cortés (MEN), Juan Pablo Morales (MEN), and Andrés E. Taboada (MME).

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Collaborators

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Introduction 1



Floods. Municipality of La Virginia (Risaralda, Colombia), 2011. Image credit: Gabriel Jaime Arango Zapata.

Disasters happen all over the world, but their economic, social and environmental repercussions have continuously increased and, they have had greater overall impacts in developing countries. Disasters can overshadow years of investment for the countries development, but at the same time the risks causes may be rooted in errors and problems arising from the same development processes. (World Bank 2006)

Colombia has been a pioneer in Latin America in developing a comprehensive vision in risk and disaster management, which has resulted in a relative decrease in casualties. However, damage to property, infrastructure, and livelihoods continues to increase. Advances in monitoring, early warning systems, as well as the organization of national and local entities for emergency response have resulted in a reduction in the loss of life caused by natural phenomena. However, efforts to contribute to territorial security, social welfare, and environmental sustainability have not been sufficiently effective to prevent exposure and vulnerability. This has been evident after the increase of economic losses in recent events, especially during La Niña 2010-2011.

The situation experienced at the beginning of President Santos' term (2010-2014) represents a major challenge for his government regarding the recovery of the affected population and their economic activities, and for strengthening the organization and policy in disaster risk management. In this context, the Government of Colombia, through the National Planning Department (DNP), requested assistance from the World Bank in the preparation of the Analysis of Disaster Risk Management in Colombia. The Bank in turn managed the funding for the implementation of the study with the Global Facility for Disaster Reduction and Recovery (GFDRR).

The objective of the analysis is to evaluate the progress of risk management in Colombia and to propose recommendations that will enable the Government to set up public policies

in this area on a short-and long-term basis. In order to carry this out, the study sought to (i) establish the risk situation and impact of disasters in recent decades; (ii) identify legal, institutional, and conceptual advances in risk management in the country; (iii) review the status and development of investment in risk management; (iv) analyze the role of territorial and sectoral entities in risk management; and (v) identify gaps and challenges in defining the responsibilities of the public and private sectors. The aim of the results of the study is to provide useful inputs for both the consolidation of the National Development Plan (PND) 2010-2014 "Prosperity for All," as well as to lead the recovery and reconstruction process associated with the recent episodes of the La Niña phenomenon, and the formulation of public policies that favor long-term development sustainability in Colombia.

The report Analysis of Disaster Risk Management in Colombia is the result of an interinstitutional and intersectoral work coordinated by the National Government, through the National Planning Department and the National Unit for Disaster Risk Management (UNGRD) in association with the GFDRR and the World Bank. The technical team that prepared the study was formed by a group of national and regional experts in risk management. In addition, the project received the support and collaboration from the Ministries of Mines and Energy, Education, Agriculture and Rural Development, Transportation, Environment and Sustainable Development, Housing, Cities, and Territories, Finance, and Health and

Social Protection. Likewise, the following entities participated: the Colombian Federation of Municipalities, the Association of Regional Autonomous Corporations (Asocars), the Agricultural Society of Colombia (SAC), the Colombian Chamber of Construction (Camacol), the Colombian Federation of Insurers (Fasecolda), the Colombian Chamber of Infrastructure (CCI), and the National Roads Institute (Invías), as well as national entities including the National Statistics Administration Department (DANE), the Colombian Geological Survey (SGC, previously Ingeominas), the Colombian Hydrology, Meteorology, and Environmental Studies Institute (Ideam), and the Agustin Codazzi Geographical Institute (IGAC).

Multiple strategies were used to carry out this work in order to evaluate advances in risk management, the perception of the State and civil society related to the results achieved, and the main challenges to be faced in the future. Previously developed conceptual approaches and other innovative concepts, which sought ways to describe what should be the articulation between disaster risk management and public management, provided a conceptual framework to guide the structure of this report. Furthermore, various research instruments were designed based on fields of application at sectoral, territorial, and community levels, including the collection and evaluation of specialized documents, workshops, interviews, and case studies systematized in eight sectors¹ and ten territorial areas². Self-assessment surveys were conducted with representatives from 173 municipalities, 12 departmental governments, 23 Regional Autonomous Corporations (CAR) and, 17 national entities. Furthermore, risk perception surveys were taken from 1,150 people in eight of the most important cities in the country. This allowed documenting and analyzing the evolution of risk management concepts, policy

and regulatory frameworks, institutions and organization structures, investments, advances, and insights related to the subject.

Analysis of Disaster Risk Management in Colombia is structured in two different formats. This Executive Summary, which presents a synthesis of key findings and recommendations, is addressed mainly to national, regional, and local authorities and decision makers and to national and international organizations, as well as to civil society and the private sector that support disaster risk management in Colombia. A detailed and complete Report, structured into six chapters, including a technical analysis, is addressed to those responsible for implementing disaster risk management policies, as well as to professionals, researchers, and experts in the subject.

This analysis starts from the acknowledgment of the great challenge that governments face in having to control and reduce disaster risks, and the efforts that the Colombian Government has made in the last two decades to meet this objective. Identifying and prioritizing recommendations for improving and strengthening effective risk management as public policy required that the analysis would be critical and at the same time positive. In this sense, the study highlights the existing gaps and limitations as a means to identifying government opportunities in order to redirect current risk management policies. The World Bank team is grateful for the confidence and willingness shown by the Colombian National Government in carrying out this work.

1 Sectors: transportation, energy, drinking water and sanitation, housing, agriculture, education, environment, and health.

2 Territorial areas: Cities of Bogota, Medellin, Barranquilla, Cali, Manizales and Cucuta; regions of La Mojana and Canal del Dique; and basins of the Sinu and Bogota rivers.

Main Conclusions of the Analysis of Disaster Risk Management in Colombia



Gaitan settlement. Municipality of Manizales (Caldas, Colombia), 2011. Image credit: Nilson Correa Bedoya.

The main conclusion from the results of the Analysis is that disaster risk in Colombia is increasing due to an inadequate territorial, sectoral, and private management, rather than due to external factors such as climate change. Figure 1 summarizes four factors that explain this

trend. However, the most conspicuous aspects of the results are from the viewpoint of the authors, interviewees, and survey respondents, and from the aforementioned, it will be possible to extract elements that will help strengthen risk management in the country.

FIGURE 1. Four factors that set risk growth trends in Colombia and increase the State's fiscal responsibility



1 The conceptual advances on the relationship between risk management and development have not been raised to the level of State policy nor have they been incorporated as an integral part of the public administration, thus contributing to the growth of risk conditions.

Despite Colombia's long history in organizing and designing risk management instruments,³ the conceptual advances achieved and the efforts carried out to update the System with this information have failed to permeate government practices. The concretion of risk reduction policies, cross-cutting in both sectors and territories, requires surmounting the reactive tendency to disasters. There is no national policy on disaster risk management and as a consequence the Government's actions

in this matter have been addressed by planning instruments such as the National Plan for Disaster Prevention and Response (PNPAD) and some Conpes documents. However, the level of the implementation of the guidelines and contents of these instruments has been ineffective.

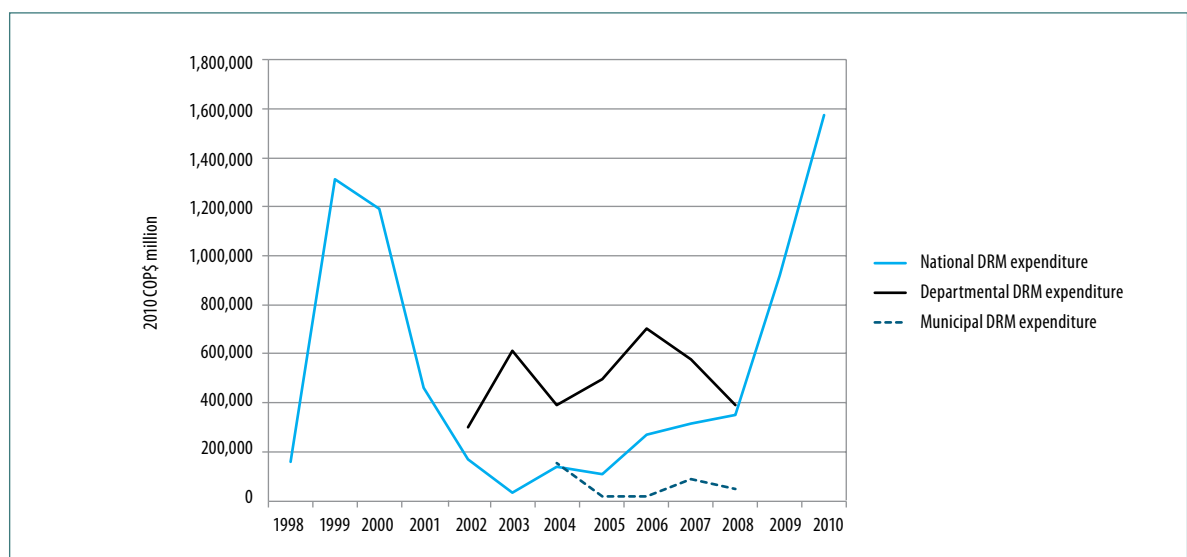
3 National System for Disaster Prevention and Assistance (1985), National Plan for Disaster Prevention and Assistance (1999), Conpes Document (2001).

There has been progress in incorporating risk management in the planning instruments, providing it with political relevance. Despite this, the fulfillment of commitments is deficient and disarticulated. Since the PNPAD formulation, the subject has been incorporated into the Development Plans (PD) of the last four presidential terms, emphasizing on risk knowledge, strengthening the system, reducing fiscal vulnerability, and risk transfer. However, although the description of the activities and challenges is quite clear and consistent with the needs, the definition of goals and indicators established for each one of these axes does not reflect the scope proposed and only partially covers the proposals outlined.

Observing the resources allocated to comply with the goals set at different government levels, it can be concluded that there

are fundamental differences in the budgeted amount and the items financed. While the nation has focused its efforts on disaster management and risk knowledge, being the main financial entity of these activities, the municipalities have focused mainly on risk reduction, particularly in areas such as reforestation and watershed conservation, which supply clean drinking water. National investment has had two growth cycles related to major disasters, namely the Coffee-Growing region earthquake (1999) and the La Niña phenomenon of 2010-2011. However, municipal investment shows an inverse performance, evidencing the nation's intense intervention in the reconstruction process, without requiring any compensation and thus discouraging the local authorities' responsibilities. The departments revealed significantly lower investments during 1998-2010 (Graph 1).

GRAPH 1. Comparison of the total investment in risk management at national, departmental, and municipal level, 1998-2010

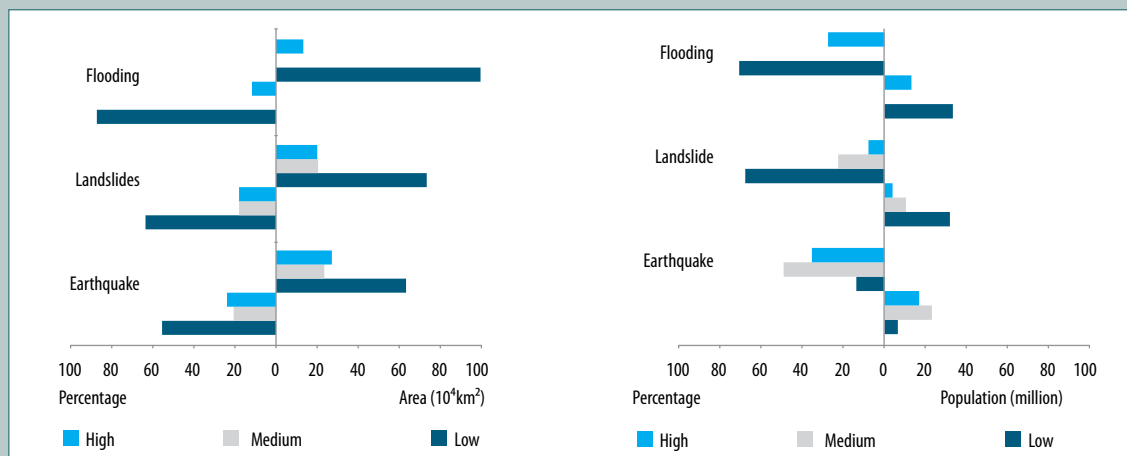


Source: Authors' chart from information provided by DNP-SDAS, 2010

Box 1. Approach to disaster risk in Colombia

From the distribution of the level of the population exposed to phenomena such as floods, earthquakes, and landslides, it is concluded that 86% is exposed from high to medium seismic hazards, 28% to potential severe flooding, and 31% to high and medium landslide hazards (Figure 2). In terms of the area, 36% of the territory is exposed to high seismic hazard, mostly in the Pacific and Andean regions (departments of Huila, Choco, Valle del Cauca, Narino, Risaralda, Cauca, and Quindio), which means that 960 municipalities, including those with the largest populations, are exposed. Some 12% of the national territory is located in areas with increased vulnerability to floods, distributed in 79 municipalities, mainly in the departments of Valle del Cauca, Atlantico, Cundinamarca, Magdalena, Antioquia, Cordoba, Cesar, Cauca, and Meta. On the other hand, 18% of the national territory is located in areas, that have high landslide risk, especially in the departments of Quindio, Risaralda, Caldas, Nariño, Cauca, Arauca, Meta, Huila, Cundinamarca, Boyaca, Tolima and Santander.

GRAPH 2. Area and population exposed to landslides, earthquakes, and floods⁴ in Colombia



Source: OSSO Corporation, 2011 from OSS O-EAFIT Corporation, 2011

The existing institutionalization for risk management at the national level, despite its long history, takes on a protectionist approach and has negligible articulation with other territorial agencies. In addition, critical factors such as the following are identified: multiple functions and great responsibilities versus ineffectual leadership in the former Directorate for Risk Management (now UNGRD), not pertaining to sectoral or territorial levels, irregular and limited operation of advisory Committees, and the possibility of creating parallel structures in the System under a state of emergency in case of a severe public catastrophe. Overall, insufficient backing in territorial risk management from the majority of governorships and the CAR is due to the divergence in interpreting current regu-

lations, which has been reflected in the weak incorporation of the subject in Land-Use Plans (POT) and Land Use Planning and Watershed Management (POMCA).

Seismic hazard management is strong, since it has greater legal and institutional instruments that define acceptable risk levels, scope of studies and designs, and the roles and responsibilities of public and private actors. For nearly twenty years, authorities have incorporated seismic resistance standards, which have established criteria in carrying out microzoning

4 Quantification of the areas and population exposed to landslide, according to the floodplain map of Ideam (2010), the landslides hazard national map by Ingeominas and Ideam (2010), and seismic hazard areas of the Seismic Resistance Standard, 2010.

studies and setting minimum requirements, and those responsible for the design, construction, and technical supervision of new buildings and reinforcing existing ones. This situation does

not occur at the same level of detail in the cases of floods and landslides, in view of the growing number of impacts caused by these phenomena.

2 Risk is constantly accumulating in cities and rural areas, due to lack of implementation and control of the municipal land use planning policies and instruments and inadequate watershed management

Planning in Colombia faces the challenge of articulating the different existing instruments, especially those related to environmental and territorial management, such as the POMCA, the POT, and the PD at municipal and departmental levels. Having a consistent and updated diagnosis (including the institutional, organizational, regulation, and financial framework for risk management, and information on specific risk conditions) is the starting point for the planning process. Subsequently, there should be an integration of risk management with other dimensions of development. Policies, strategies, and especially priority programs should be defined within the annual investment plan and ensure that goals and indicators facilitate monitoring and control activities. These elements should be incorporated into the POMCA as instruments with greater hierarchy and scale in watersheds and more specifically addressed to the POT and incorporated into the PD to assure investment. Therefore, overcoming the current disarticulation of planning instruments is a critical step for disaster risk management. This would allow the integration of policies, prioritization of investments, and the strengthening of mechanisms for monitoring and control.

The ambiguity in regional competencies in planning and land use planning increases risk. Whereas there is no single au-

thority in regional planning or a balanced system that integrates the instruments of different character and level, municipal risk growth in both urban and rural areas is the result of decisions and actions related to disarticulate territorial use and occupation by different actors. Regional planning competency is shared among the departments and the CAR. The departments have the responsibility to guide local planning in a supramunicipal context and to coordinate the formulation and implementation of the PD and the Departmental Water Plans (PDA). In turn, the CAR have the authority to (i) formulate planning and watershed management instruments, which may not always coincide with departmental boundaries; (ii) regulate the use of rural land by means of issuing licenses for the right to use water, which interferes with the constitutional duty assigned to the municipalities to regulate land use; and (iii) approve the environmental proposals of the municipalities' POT that the CAR rarely review when granting licenses. In so far as planning, land use planning, and rural land use, these are loosely referred to in the POT, so the decisions are taken by the CAR or they are made at a national sectoral level. The regional territorial management responsibility is diluted among various actors, not only at a national or regional level, but also among private entities involved in the geographic area.

There are factors associated with policies, territorial planning, and control mechanisms that are affecting the way in which risks have been shaped and emergencies and disasters have taken place in the history of the country's cities. Some of the factors contributing to the above are weak planning, lack of control policies, land speculation, monopolization of construction materials and supplies, and the particularities in the administration of local territories, which have only had competence over land use since the 1991 Constitution. On the one hand, the needs of land occupation, under an unplanned city model, oblige overcoming the natural limits of habitability, demanding greater interventions to achieve stability. On the other hand, the absence of an urban-regional land policy and the belated interventions in regulation and control influence a disarticulated expansion process that affect territorial reality in biophysical, social and, economic terms. This is evidenced through spontaneous participations, plot by plot, and making clear the difficulty of responding with effective housing solutions and providing more and better public facilities. In addition, activities related to the exploitation of building materials without planning, control, or proper recovery have greatly contributed to instability in hillside areas and environmental degradation, especially in the outskirts of cities.

A high exposure to diverse and potentially dangerous phenomena has been identified in Colombian cities. There has been a gradual increase in the occupation of areas that are unsuitable for ensuring sustainable development. As a result, the population is under elevated hazard levels. However, in addition to spatial exclusion factors, economic and social exclusion factors are also observed, which are found to correlate to an accumulation of risk conditions.

Municipal government agencies are expected to respond to variations in the quality of life, both in urban and rural areas. However, many of these agencies are not prepared to meet the basic needs of their inhabitants in regard to housing, employment, availability of utilities, education, health services, and transportation (Díaz 2007). Indicators such as the Unsatisfied Basic Needs (UBM) Index and the Poverty Line Index, or overcrowding levels, support the aforementioned statements. Furthermore, the quantitative and qualitative housing deficit is concentrated in the poorest classes, which gives rise to a vicious cycle regarding access to adequate and safe housing for the most vulnerable population groups.

In some cities in the country, accumulation of risk has also been observed in formal construction areas as well as in upper-class areas. Environmental problems generated by land speculation and conflicting uses within suburbanization processes have been revealed.⁵ In Medellín, Cali, and the Bogota Savannah, there have been emergencies in formal construction areas, which implies that risk is created not only in illegal settlements built without appropriate construction techniques, but also in developments that have not undergone any type of local or regional planning. Additionally, the desire for economic gain by landowners has taken precedence over the planning and investment required for preparing and installing the service infrastructure and equipment needed for construction in suburban areas.

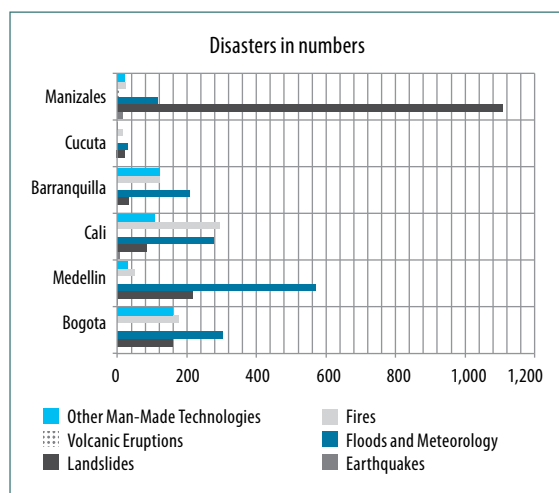
5 Known as the growth processes of cities, through which suburban areas are created. From the spatial point of view, these areas are adjacent to spaces of continuous urban building, and they are used as transitional areas between cities and rural areas, where both functions are in competition.

Colombian municipalities show a growing trend in disaster occurrence, although in some cases, progress has been made in significantly reducing their impact and frequency. Biophysical and geographical factors in municipalities that determine vulnerability to certain types of hazards, along with inadequate procedures for territorial intervention, marginal human settlements, and social and economic segregation, generate numerous vulnerabilities, which have had disastrous consequences throughout the history of Colombian cities. Cases such as Cali, Medellin, Cucuta, or Barranquilla show that the risk factors in the cities are accumulating and taking shape in a greater number of events and damage concentration. In other cases such as Manizales and Bogota, due to the risk management actions, the impacts associated with disasters have diminished, but there are still critical conditions that demand the sustainability of such policies. In general, special category municipalities have an immense capacity in incorporating risk management in planning,

finance, and execution, while those that are in category 1 show medium competence, although in most cases they have the resources to carry out adequate territorial administrative organization. As for the municipal categories 2 to 6, these have a more critical situation due to technical, human, and financial limitations. Graphs 3 and 4 indicate the total number of events in case studies of the cities according to phenomenon type in numbers and percentages.

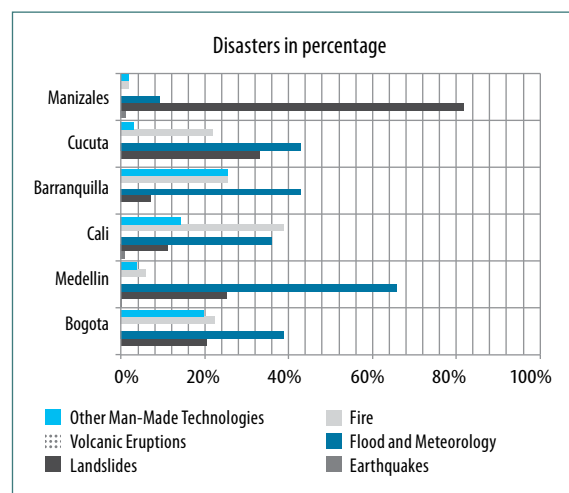
Land use planning is not a recent process in the country. However, its progress has not been uniform among municipalities. A negligible level of acknowledgement in hazard scenarios and their management needs, gaps in hazards and vulnerability identification, lack of articulation in investment instruments, and weaknesses in monitoring and controlling mechanisms confronting the POT implementation are some of the obstacles that reduce the effective incorporation of risk management in land use planning. Specifically, the situation is more critical in mu-

GRAPH 3. Registered number of disaster events in cities studied, 1970-2011



Source: Authors' chart from information provided by OSSO-EAFIT Corporation, 2011.

GRAPH 4. Percentage of disaster events in cities studied, 1970-2011



Source: Author's chart from information provided by OSSO-EAFIT Corporation, 2011.

municipalities in categories 2 to 6 given their low technical competence, thus requiring backup of appropriate incorporation of risk management in the POT⁶.

Municipal Development Plans are instruments that allow moving from policy to risk management practice, guiding the territorial planning and, in turn, executing the necessary actions. The PD have a political makeup, so that the incorporation of risk management requires a consensus process with different social agents. Starting from a technical assessment prepared and properly updated, the preventive, corrective, and reactive actions for risks are defined and should be integrated into the annual investment plans through policies, strategies, and programs, using their corresponding monitoring and control system. In turn, municipalities in categories 2 to 6 state the need to strengthen the use and effectiveness of this planning instrument, by targeting technical criteria, having the awareness that will allow continuity at the political level, and the budgetary provision to ensure comprehensive disaster risk management.

Financing and investment instruments in risk management are rarely used and the resources basically correspond to the current revenues of the municipalities (37%), followed by transfers from the General Participation System (SGP) (21.1%). The cities that invested in risk management between 2002 and 2008 were Bogota, Medellin, and Manizales, amounting approximately to 43% of the total investment at the municipal level⁷. The per capita investment in risk management in Bogota averaged COP\$21,238, and in Manizales it was COP\$16,981. Likewise, Medellin invested during that period COP\$14,712 per capita, and Cali COP\$10,713, in contrast with cities like Barranquilla, where the per capita investment amounted to only COP\$5,278. Specifically, the

amounts of risk management investment in the last two cities did not have significant impacts, despite being minor in comparison to other urban centers in the same category; the investment was disarticulated and scattered.

Apart from the weakness in incorporating risk management into territorial planning, there is also an absence of real articulation with environmental instruments, where the POMCA should provide guidelines for the preparation of municipal POT and comprehensive watershed analysis. The 83 POMCA adopted at the time of the PND 2010-2014 formulation are long-term plans, have their own watershed analysis, use scenarios and guidelines for their management and administration, but have not yet adequately incorporated the risk management component. Most of the POMCA only describe the types of phenomena currently existing in watersheds without exposing a special analysis of hazards and much less of risks, so the contribution offered to land use is very limited. It is therefore a priority to promote a comprehensive perspective between risk management and environmental management to complement the efforts and initiatives associated with natural phenomenon risk control and management.

6 Therefore, efforts have been made through Fiscal Vulnerability Reduction Program to Natural Disasters, where the national government between 2006 and 2011 provided technical assistance to 792 municipalities (equivalent to 72% of municipalities) for the inclusion of the risk analysis in the municipal POT and municipal PD, of which 379 municipalities already have an action plan. In addition, 36 municipalities have hazard and/or risk zoning studies.

7 The information for the investment analysis in disaster risk management for this publication is supported by the databases provided by the DNP with Sustainable Territorial Development Directorate (DDTS), which include investment data at the municipal level (period 2002-2008).

3 The gaps in the field of disaster risk management policies and sectoral plans threaten the sustainability of investments, both in productive and service sectors, thus contributing to an increased exposure and vulnerability.

Institutional and sector-specific capacity in risk management is heterogeneous and quite limited. Although regulations such as Decree 919 of 1989 and the 3146 Conpes Document request the creation of agencies with specific functions for risk management in several Ministries, the only national sectoral entities that have disaster prevention and response offices are Invías, the Department of Water and Sanitation, and the Ministry of Health and Social Protection. Currently, the Ministry of Agriculture and Rural Development is seeking alternatives to create an Agrarian Risk Management department and the Ministry of Environment and Sustainable Development has also considered the possibility of establishing a department for disaster prevention and response.

The role of municipalities and departments in the implementation of sectoral policies is essential, since they are administrators of their territory, responsible for providing public services and risk management. The lack of policies and instruments for risk management in the different sectors as well as support, complementarity, and competencies that transfer strategies to local authorities may be considered as one of the main factors in producing risks. For example, according to Law 136 of 1994, regarding housing, and municipalities are required to regulate land use, control and inspect construction and the sale of residential properties. However, only 35 cities have Urban Curators and about 90% of Colombian municipalities (categories 5 and 6) do not have trained personnel or resources to perform these tasks properly. As for the trans-

portation sector, municipalities are responsible for the tertiary network, which generally has the greatest vulnerabilities.

There have been major developments in the availability of information in the fields of energy and education, while other areas show limited risk knowledge, which is a key element in designing sectoral policies. The energy sector offers real-time information on hydroelectric reservoir levels and weather forecasts, resulting in making timely decisions to avoid service shortages. In relation to the education sphere, an infrastructure inventory is being processed. It has defined mechanisms for post-emergency damage assessment, which were implemented in the census of the damages suffered by the La Niña 2010-2011 phenomenon and have shown to be valuable instruments that provide a timely response to this sector's needs during the last emergency. In other areas, the availability of systematic and prior information at a detailed level required to make decisions is limited.

Unfortunately, in other sectors the lack of application of technical and design standards to ensure proper location and quality of infrastructure is influencing the systems' vulnerability. Weak technical regulation and mechanisms that allow incorporating security criteria from the projects' pre-feasibility as well as the infrastructure design, construction, and operation of different services and production systems generate risk conditions. This is especially critical in road systems, safe drinking water, and sanitation. The weather conditions of the country, its difficult topography, and the young geology of the Andes are quite de-

manding, but the real causes of the disaster impacts in the road infrastructure are its design, prevention, and maintenance deficiencies.

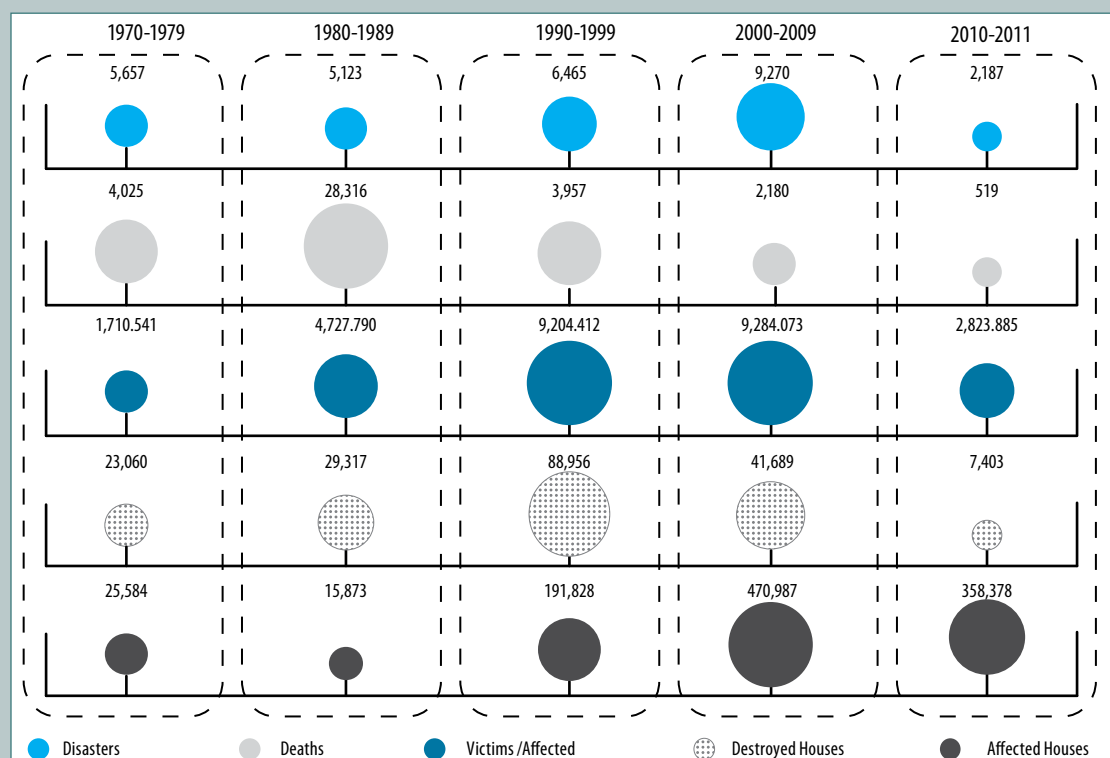
The increase and accumulation of vulnerability to residential buildings facing hazardous phenomena in Colombia are mainly due to the growth of informal housing, the breach of standards in design and construction, its location in hazardous areas, the possible presence of adverse natural phenomena, and the lack of strategies to intervene in constructions prior to the first seismic resistance standard (1984). According to DesInventar information (OSSO-EAFIT Corporation 2011), out of the 190,000 houses destroyed by disasters in the country during the period 1970-2011, the greatest losses were caused by floods (more than 79,000 units), while earthquakes affected a total of 51,000 houses, landslides almost 18,000, volcanic eruptions 5,400, and other events such as gales and fires, among others, 35,000. It can be concluded that 51% of residential buildings destroyed between that period (those affected by floods, landslides, and volcanic eruptions) were the result of their location in areas unsuitable for housing developments, while 26% of households destroyed (by two earthquakes) can be associated with construction deficiencies.

On the other hand, the damage caused by extreme weather conditions in the agriculture sector is due to the vulnerability of this sector when facing these conditions. These resulted from the lack of clear responsibilities and strategies for risk reduction, as they were addressed in the PND 2010-2014. Thus far, the measures taken by the government to manage the impact of disasters in the agriculture sector have been more of providing a response to the effects than of working on prevention and mitigation of risk factors. The strategies implemented are supported primarily by providing direct compensation or financial relief to the affected farmers after the occurrence of the phenomena. The only measure available that could be considered as preventive is the agricultural insurance subsidy. Despite the efforts made by the government, its popularity has been very low due to insufficient disclosure of information and little awareness of the benefits of this insurance. Analysis considers that the Ministry of Agriculture and Rural Development requires the design of much more comprehensive risk reduction strategies and measures that take into account rural land use planning, the improvement of productive infrastructure, and the adaptation of agricultural species.

Box 2. The historical impact of disasters in Colombia

Cumulatively, over the past forty years, disasters in Colombia have caused losses amounting to US\$7.1 billion⁸, that is, an average annual loss of US\$177 million. Between 1970 and 2011, the country has registered more than 28,000 disaster events, of which about 60% were reported from the 1990s on. Additionally, during 2010 and 2011, in just 15 months an equivalent figure amounted to one quarter of the registries and fatalities in the previous decade. There is a noticeable increase in the disaster event occurrence, increasing from 5,657 registered between 1970 and 1979, to 9,270 registered between 2000 and 2009, which is related not only to the availability and quality of the information sources, but mainly to the increase of the population and the property exposed.

FIGURE 2. Disasters and losses registered per decade



Source: The authors' figure from information provided by OSSO-EAFIT Corporation (2011).

Although geological events such as earthquakes and volcanic eruptions cause great losses in a concentrated territory and elapse in a relatively short time, the hydrometeorological phenomena cause high-frequency impacts that over time mean even higher cumulative losses. In the period 1970-2011, major disasters have caused housing losses of approximately US\$2 billion⁹, while intermediate and small disasters reported losses in the same category of approximately US\$5 billion, totaling 2.5 times more than the previous events (OSSO Corporation 2011).

- 8 Corresponds to housing economic losses (millions of dollars, 2010), due to geologic and hydrometeorological phenomena between 1970 and 2010 (OSSO Corporation 2011).
- 9 Losses in the housing sector for seven major disasters: Popayan Earthquake, 1983; Volcano Eruption of Nevado del Ruiz, 1985; Atrato Medio Earthquake, 1992; Páez Earthquake, 1994; El Niño phenomenon, 1997-1998; Coffee Growing Region Earthquake, 1999; La Niña phenomenon, 2010-2011. Source: OSSO Corporation (2011) based on Cardona et al. (2004); CAF (2000); ECLAC (1999); ECLAC (2011).

4 The absence of a clear policy and the background in which the State generally assumes the responsibility, discourages citizens and the private sector from undertaking their role in risk reduction and management, thus resulting in greater fiscal costs.

In relation to losses or damages suffered from disasters, although the Constitution assigns the State the duty to protect people “in life, honor, property” in case of natural or socio-natural events, the Council of State has ruled that the government can only be responsible when damage is caused by an act or omission (failure) of public entities. Under the Constitution, the authorities are set up “to protect all persons residing in Colombia, in life, honor, property, beliefs and other rights and freedoms and to ensure the fulfillment of the State’s and individuals’ social duties” (Article 2 CP), which is a broad statement and subject to interpretation. However, the Council of State, in pronouncing judgment dated June 24, 1994, on the tragedy of the avalanche that destroyed Armero, concluded that the State may possibly have had responsibility only if the trial judge proved (i) a service failure, (ii) unlawful damages to individuals, (iii) a causal link between the failure and the damages, and (iv) the absence of grounds for exoneration such as force majeure.

Once the damages are evidenced, although triggered by a physical event of a dangerous nature, which are attributable to a failure of public entities, the State is obligated to pay compensation. Article 90 of the Constitution imperatively expresses that “the State shall be financially liable for unlawful damages attributable to it, caused by acts or omissions of public authorities.” Based on Article 13 of the Constitution, the State has on the one hand the obligation to provide solidarity protection, sometimes called humanitarian, and on the other hand it may be required to satisfy materially

for harmful disaster consequences caused by dangerous physical phenomena, provided that the damages in whole or in part, exclusively or concurrently, have been caused by the action or omission of the State.

Despite this State obligation, the lack of clarity in some standards, their interpretation by the courts, and weaknesses in the defense of the State, have led to controversial decisions, generating contingent liabilities and escalating the nation’s fiscal vulnerability. There are many examples where the ruling by the judges has obligated municipalities to take actions that may be considered controversial. For example, the city of Cali was condemned to bear full responsibility for the failure of a retaining wall in a stratus 6 building whose costs exceeded COP\$10 billion. Moreover, a judge ordered the municipality of Bogota to carry out mitigation works in an area that was in the process of resettlement after it was declared a high-risk zone and not possible to be mitigated. The compliance with this latest ruling cost over COP\$30 billion and in addition, the resettlement of more than 3,000 families continues because the area remains under risk.

In the absence of a prior policy or more important regulatory developments in assisting the affected population, the State has been forced to make decisions during various crises, which have led to differential treatment and fiscal consequences. During the rebuilding process, after the disaster in the Coffee Growing region, the fund for its reconstruction, FOREC, offered repair subsidies to all affected homes regardless of social status. This decision was later amended by a

court order based on the right to life, forcing FOREC to structurally strengthen the houses that were being repaired. Additionally, the decision to bring the affected people to temporary shelters obligated FOREC to allocate subsidies for new housing to all affected families, including those who were previously paying rent before the earthquake. Government decisions regarding the response to the La Niña 2010-2011 episode are aimed primarily at the population in strata 1 and 2, and restoring services is being rendered by the State. These processes are currently being carried out by Humanitarian Colombia and the Adaptation Fund.

The private sector and civil society are not aware of their responsibility toward risk knowledge, occurrence, reduction, and control, forcing the Government to assume responsibilities and costs that are beyond its competence. The configuration of risk conditions of a country is largely the result of decisions made by its citizens. People choose where and what type of dwelling they inhabit, how to protect their lives and their families, how to invest their family's patrimony, and make even seemingly trivial decisions like where to take vacations, determining directly or indirectly the country's risk conditions. To evaluate Colombians' risk level awareness and their responsibility in risk reduction and management, and to make recommendations for improving their decision making, the World Bank conducted a national awareness survey within the framework of this study.

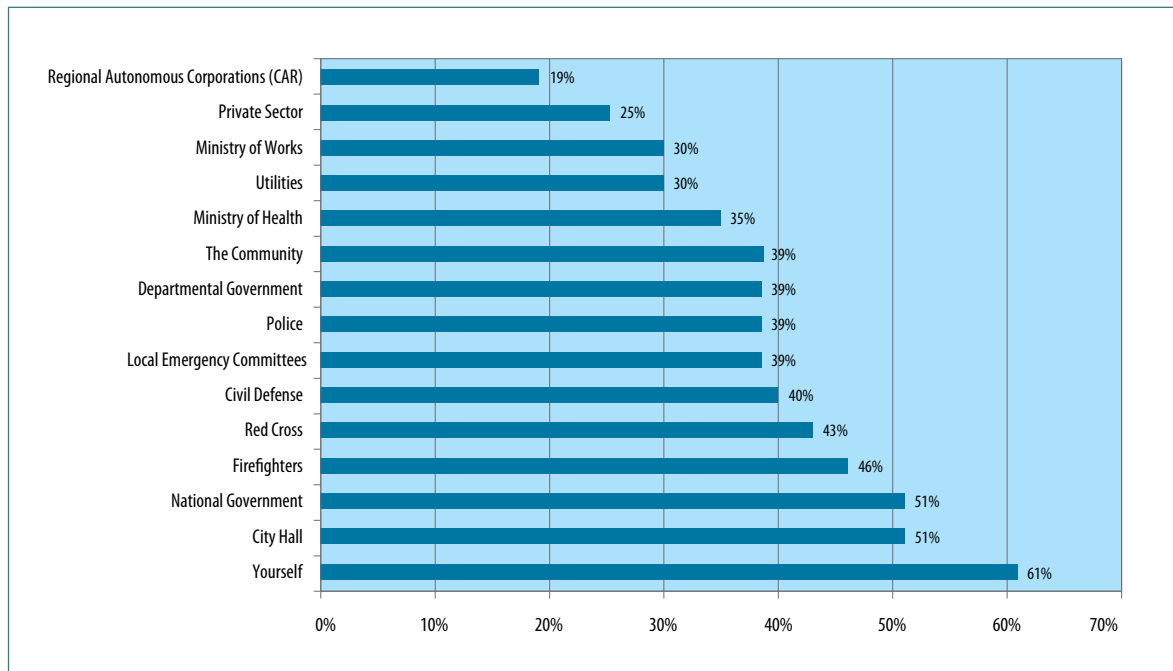
According to the survey, 18% of Colombians do not feel exposed to any risk derived from natural risk phenomena that endanger their lives, while 82% perceived themselves as threatened by some risk. Out of the Colombians who feel at risk from natural hazards, only 61% believe they should take steps to reduce it,

and only 35% reported having done so. There is a tendency for greater identification and recognition of risks associated with more frequent events such as floods and landslides, in contrast to the perception they have of seismic hazards, although the impacts of the latter have been severe for the country.

In addition to the citizens' lack of clear responsibility in risk reduction, the survey indicates that about 40% of Colombians believe that implementing intervention measures is the duty of other agents. Some 61% of respondents believe they should take steps themselves to reduce their risk and this task should be complemented by the national government and relief agencies' actions. However, the remaining 39% believe that it is entirely the responsibility of the government and relief agencies and that it is not their obligation to intervene (*Graph 5*).

As a result of insufficient knowledge related to risk and the need to take preventive measures, in general protection and assurance mechanisms in buildings and individual patrimony are not used, which increases pressure and public risk (fiscal vulnerability). According to Fasescolda's data (2011), only 7% of those affected by the La Niña 2010-2011 phenomenon had insurance. In Bogota, only 4.5% of the condominiums are insured and in the other cities studied this figure may be lower. In the earthquake that occurred in the Coffee Growing region (1999), only 10% of direct losses were covered by insurance.

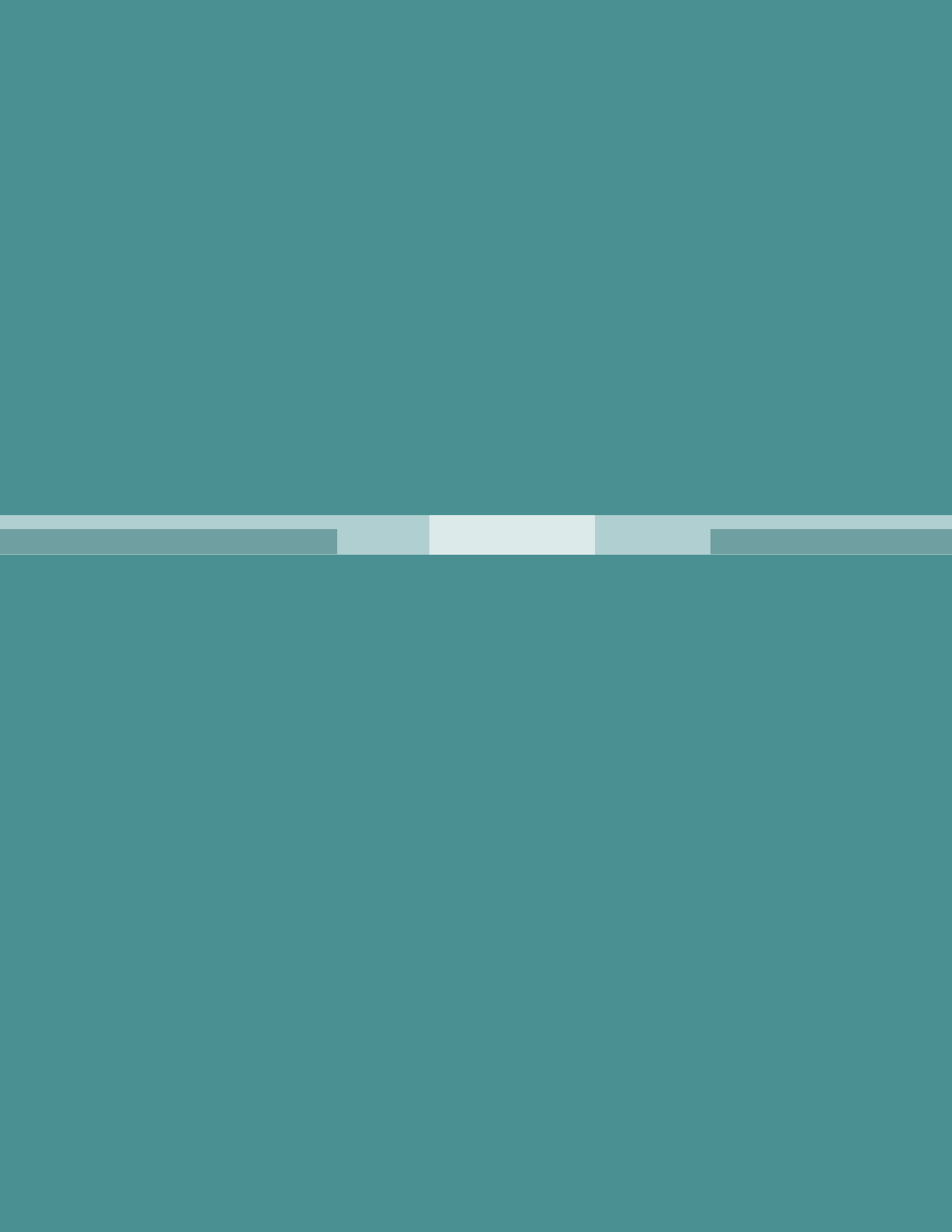
GRAPH 5. Social agents responsible for taking prevention and response measures to disasters



Source: World Bank, 2011.

Sample base: 1,148 respondents.

Events that can produce the most critical future scenarios from the viewpoint of their financial impact and loss of life are a severe earthquake, a volcanic eruption, and a La Niña phenomenon episode. Earthquakes, although they are rare events, have a greater potential impact in the country. However, a large-scale volcanic eruption, although it may recur in more than 500-year periods, would mean a scenario of a crisis of national magnitude. The most relevant effects in terms of number of municipalities with significant impacts on all sectors, but especially in the agriculture sector, may be produced by heavy cumulative rainfall caused by the La Niña phenomenon. As previously seen, severe flooding and widespread landslides have affected a significant percentage of the country, causing serious crop damages to landlords possessing large tracts of land, and in the livelihoods of small farmers, as well as housing, transportation, and other sectors.



Six Main Challenges to
Achieve Governance in
Disaster Risk Management in
Colombia and Thirty Proposed
Activities to Accomplish it

3



As a result of the work carried out, **six strategies and thirty activities were established to enhance governance in disaster risk management.** These strategies are aimed at consolidating government policy in disaster risk management that comprises strengthening local capacity for land use, articulating the

different agents involved in watershed management, defining development sectors' responsibilities, and promoting the participation of all public and private actors, thereby contributing to reducing the State's fiscal vulnerability to disasters (Figure 3).

FIGURE 3. Six strategies to improve governance in disaster risk management in Colombia



1 Incorporate risk management as a State policy and overcome existing imbalances in the System through the adjustment and harmonization of a regulatory and institutional framework

Adopt a national policy in disaster risk management that is integrally articulated with public administration, provides support to the territorial entities, and promotes the creation of specific policies and sectoral action plans. The risk management policy, as an integral part of public administration, should be articulated in planning, execution, monitor-

ing, evaluation, and control of the economic, social, cultural, technological, environmental, and political strategies. It should be more decentralized, participatory, democratic, and results-oriented. This policy should consider risk knowledge and information, its reduction and disaster management as well as its contribution to territorial safety, social welfare, quality

of life, and sustainable development, starting from creating regional consensus spaces and cooperation mechanisms among municipalities, governments, the CAR, regional entities, if any, sectors, and other National Government actors. Likewise, it is in charge of promoting the creation of policies and sectoral action plans so that each sphere defines its responsibility in its infrastructure safety, minimizing loss of life and the impacts on production means facing disaster risks, and ensuring the ongoing rendering of services.

The policy requires the formulation and implementation of specific strategies for each of the geological and hydrometeorological phenomena, considering variables related to climate change, and prioritizing the most recurrent phenomena. Last but perhaps most importantly, this policy should promote capacity strengthening, complementarity, and subsidiarity strategies to provide support to municipalities in territorial risk management, recognizing that local capacities are limited (based on availability of economic, technical, and human resources).

Create a risk management statute to harmonize the current legislation addressing the gaps identified in defining public and private responsibilities. Legal reorganization is required for all norms related to disaster risk management, through a specific statute that would also complement aspects that are not yet regulated. Defining the processes in knowledge, risk reduction, and disaster management is recommended for each of the different phenomena. Likewise, the actors who should be involved at the different territorial levels and their specific roles and responsibilities should also be included. The statute should also articulate the different regional levels to work together according to their capabilities and resources, thus ensur-

ing compliance with the principles of competition, subsidiarity, and complementarity as established by the Constitution. With regard to risk materialization situations, it is essential to explicitly regulate the types of different situations (emergency, disaster, calamity), so that the concept of severe public calamity, as provided in the Constitution, Article 215, is consistent with the current disaster declaration (Decree Law 919 of 1989). It is also necessary to regulate the responsibilities and instruments of the recovery processes (rehabilitation and reconstruction). The contact points between sectoral legislation and disaster risk issues should be strengthened, and the participation and involvement of persons in this management require specific regulations.

Reorganize the System, by strengthening technical and financial management capacity at the different territorial levels and including the participation of the private sector. A normative and structural transformation of the System is needed. It should include its mission, vision, and the objectives of the State and society actions in facing risks and disasters¹⁰, as well as being in coherence with the Constitution, through an adequate articulation with the principles and guidelines contemplated therein. It is necessary to change the current notion of disaster, reduce duplication in functions, and establish mechanisms to ensure a coordinated effort so that all actors involved have a clear understanding of the System's orientation and its contributions in achieving the proposed objectives. Local Government Councils should be the basis of the System and substitute the committees' formal structure, whose management and

10 As the Act Project proposed, filed In the Congress of the Republic in July 2011 (Ingeniar Ltda., 2011).

decision-making process should be guided by the planning. Likewise, it is also necessary to strengthen the departmental level in its articulating role between the national and the local spheres and among the municipalities within its jurisdiction. This should be done at the same time that the nation, in formulating and implementing its strategic policy role based on the territorial entities' needs and capacities, shall consequently provide technical assistance, cofinancing, and incentives to promote better and more efficient risk management by territorial authorities.

Give priority to the strategic orientation, technical leadership, authority, and control of the functions performed by the National Unit for Disaster Risk Management (UNGRD) as the head of the System. The UNGRD should assume a clear strategic leadership, maintain its main coordinating role of national risk management policy, and carry out authority and control functions. In addition, it

should rely on highly skilled technical human resources and strengthen its internal operating procedures. Leading risk management policy not only involves the coordination of institutional activities led by the government entities, but it should also mediate among all levels of government in the country, in compliance with the principles of coordination, concurrence, and subsidiarity. Additionally, it should work on improving the information system to establish itself as a support instrument for all processes. Its successful management depends on the skills and the convening and coordination mechanisms produced. Its function and activities should focus on strategic leadership and management and leave operational responsibility and emergency management efforts to other actors. This unit should also create incentives in the System's different entities, linked to strategies and priorities identified and agreed to in the National Risk Management Plan.

2 Increase the effectiveness and efficiency of risk management investment through strategic planning, coordination among territorial levels, and monitoring and control

Promote the adoption of the Territorial Risk Management Plans (PTGR) as long-term instruments to guide the POMCA, the POT, and the PD, and articulate public and private investments. This ensures the integration of programs and projects in the corresponding institutional investment plans, and complementarity among different funding sources in order to achieve greater effectiveness. These plans should include activities related to risk knowledge, its reduction, disaster management, capacity strengthening, as well as managing relevant risk management information.

Establish a national cofinancing (fund) mechanism to encourage investments in disaster risk management and building capacities at territorial and sectoral levels. Creating a Disaster Risk Management Fund requires establishing different financing strategies and mechanisms under the existing risk conditions and the municipalities' capacities. Focusing mainly on capacity strengthening and cofinancing regional and sectoral projects contributes strategically to risk reduction. The fund should cover preventive and corrective actions as well as emergency response, so that the territories share in the

responsibility and thus the municipalities evaluate the effectiveness of including in their annual budget a representative percentage allocated to risk management to leverage resources as a counterpart to what is available in the Fund. It should be articulated as part of a financial strategy that allows transfer and risk retention.

Adopt risk reduction goals in policies and plans, and ensure compliance through progressive implementation of results-based strategic planning. Modern risk management has the challenge to evolve towards strategies that achieve greater investment transparency and effectiveness using a results-based monitoring and evaluation approach applicable to projects, programs, and policies. This type of monitoring and evaluation requires the definition of roles and responsibilities in the generation of products and results by those involved, thus establishing a clear and verifiable relation between the results expected and the allocated resources. It strengthens investment articulation and territorial, sectoral, and institutional coordination. It also requires the definition of baselines and the identification of key performance indicators, and facilitates the implementation of incentives in terms of performance recognition. It is not an easy task, as it requires commitment, time, and effort, but national and international experiences in other areas show that the work is justified by its proven successful performance.

Strengthen the mandatory incorporation of criteria in disaster risk management when formulating public investment projects.

In order to effectively incorporate risk management throughout the planning process and the execution of public investment, it is necessary to explicitly express it in the formulation of projects filed in the Public Investment Project Banks (BPIN). Although there has been some initial progress, to incorporate the subject, it is necessary to review the General Adjusted Methodology proposed by DNP, which determines the minimum content of preinvestment studies, and verify the analysis components, the project evaluation, and the registration cards.

Adopt a strategy for following up on responsibilities and investments for risk management at different territorial levels.

The strengthening of policies and plans, clarification of roles and those responsible, and the definition of baselines and performance indicators should count on strengthening monitoring and control processes. Their importance comes from the fact that authorities and civil society should fulfill the tasks of monitoring and controlling the entire public administration process, not only the end result. Working together is pertinent for ensuring articulation and continuity of the actions required for regional planning and risk management.

3 Strengthen local capacity in territorial management in order to reduce the causes and accumulation of disaster risks

Adopt a national strategy to strengthen municipal risk management that takes into account the differences among the capacities. Risk management and regulation and land use planning control are closely linked to the municipal administration's operational capacity and action, as well as the restrictions made on their professional personnel, their technical training, and their limits to accessing available technologies. In order to guarantee, on a mid-term basis, an appropriate control of hazard, vulnerability, and risk conditions, it is necessary to strengthen the municipalities at the institutional, technical, and financial level by adopting a proactive and strategic approach according to the complementarity and subsidiarity principles set forth in the Political Constitution of 1991. These municipal capacities are clearly differentiated according to the categories specified by the DNP and the DANE, which then may propose recommendations for municipalities with high, intermediate, and low capacity. Therefore, different options should be analyzed through the following approaches: (i) Redefine the competence distribution in line with the municipalities' potential capacities and their different characteristics and requirements in a sector (if this can be said of a cross-cutting subject like risk management) which Law 715 of 2001 did not take into account. (ii) Consider the possibility of applying a municipal certification system for risk management processes and establish a priority in subjects such as risk knowledge, investment in its reduction, and land use planning. (iii) Broaden the Departments' and the CAR's responsibilities and competencies in order to support risk management at the municipal

level. (iv) Foster greater cooperation among different government entities with the aim of fully developing the aforementioned principles. (v) Identify and analyze successful partnership experiences in providing services in risk management so that these may be implemented in horizontal cooperation processes among territorial entities. (vi) Study strengthening mechanisms in the fields of risk information and risk knowledge by decentralizing technical-scientific organizations, such as the SGC and the Ideam; coordinating among universities and research centers through the National Science and Technology System; clearly defining the responsibilities undertaken by the CAR, departmental governments, and other national or sectoral agencies; and enriching the municipalities' capacities with the purpose of supplying the information needed for risk management as part of management and territorial planning.

Structurally review deficiencies in the capacities to assess disaster risk in order to provide an effective response to the knowledge demand for the POT and the PD. Although a significant effort has been made in the country in carrying out hazard and risk studies, there have been few results at the different territorial levels so that appropriate decisions cannot be made to reduce them. Their evaluation should follow a prospective approach taking into consideration the possibility of highly destructive events in the future. Therefore, risk assessment should be oriented at applying models that allow using the scarce information available in order to forecast possible catastrophic scenarios in which great uncertainty is taken into account in the analy-

sis. Likewise, the systematic loss and damage registers have to be more efficient and effective, since these are fundamental in measuring the extent of the disaster's real impacts. The implementation of a technical support strategy, coordinated among national entities and departments, is indispensable to facilitate future updates of these risk scenarios as well as the formulation of the new municipalities' POT and the PD's jurisdictions with less than 50,000 inhabitants. According to Law 507 of 1999, the National Government has implemented technical assistance in the municipalities particularly through the Ministry of Housing, Cities, and Territories, the previous Risk Management Office, and some CAR. However, other government entities such as IGAC, DANE, Ideam, SGC, and the universities and research centers have yet to combine their efforts. Similarly, it is essential that the departments take the lead and support with greater vigor the municipalities' formulation of the POT and the incorporation of risk management in the PD.

Strengthen the departmental governments' capacities in coordinating the municipalities, defining their competencies in disaster risk management according to the principles of concurrence and subsidiarity capacities as established in the Constitution, and the possibilities offered by the Organic Land Use Planning Law. The recently approved Organic Land Use Planning Law offers alternatives aiming at reinforcing functions among territorial entities in risk management, especially in the departments where the common denominator of almost all the municipalities is disturbing poverty indicators and low-level institutional capacity, as for example in Amazonas, Guaviare, Guainia, Vaupes, and Vichada, the majority of the Pacific coast municipalities (Choco, Cauca, and Nariño), and a great part of Caribbean mu-

nicipalities (La Guajira, Magdalena, Sucre, Cordoba, with the exception of their capital cities).

Design and implement the PTGR as instruments to orient and give priority to interventions and investments in municipalities and departments. The PTGR seek to contribute to the acquisition of knowledge in risk scenarios, the application of integral interventions for reducing and controlling risks, and fortifying actions in disaster management. Articulated agendas and action plans among responsible entities should be established in order to develop internal procedures, define tasks, and guide and optimize the use of the resources available (municipal agencies, public companies, the private sector, departmental governments, CAR, etc.). Planning should be accompanied by greater investment; therefore, Planning and Finance have to reinforce the allocation of resource mechanisms and to verify the safety conditions related to the different policies and types of expenses to endorse, from their origin, risk reduction in municipalities and districts.

Formulate and implement the national policy in order to intervene in settlements at risk that set the guidelines for land zoning, and define mitigation criteria and action strategies. The municipalities' POT should clearly establish the management of high-risk areas in accordance with the national policy. Mitigation may be understood as a condition where it is feasible to intervene technically, economically, socially, and politically in a territory, in order to reduce risk for the purpose of producing stability in the population, the infrastructure, and the economic activities within reasonable and socially accepted safety margins (Ramírez & Rubiano 2009). This means that a comprehensive analysis has to be prepared that will define if a high-risk territory may or may not be mitigated. Depending

on the condition defined, specific intervention actions should be established, in which are considered, among other factors, mitigation works (when these are mitigable) or the resettlement of families (when it is not mitigable). In some cities where there is greater management capacity, progress has been made in the establishment of risk reduction criteria and intervention policies. However, implementing a national policy will provide instruments for the municipalities to duly develop actions oriented to appropriately manage high-risk areas.

Reduce the amount of housing in high-risk areas by implementing integral neighborhood improvement and family resettlement programs from nonmitigable risk areas. The focalization of actions aimed at reducing exposure and vulnerability is an effective option to diminish risk conditions. This means incorporating in the POT and the PD projects and specific investments that are focused on implementing these two programs as basic axes to reduce existing risks. The development of these programs entails the participation of different municipal agencies so that their intervention is carried out completely and integrally. Sectors related to housing, education, social welfare, and public services, among others, should work jointly. Moreover, and with the purpose of protecting areas that have been

resettled, surveillance, municipal land use, and occupation control programs are required through the participation and intervention not only from the responsible entities, but also within the same communities.

Promote and continue the efforts carried out in the cities (case studies) for cross-cutting inclusion of disaster risk management in planning and municipal investments as a fundamental strategy in land development. The cities studied (Bogota, Cali, Medellin, Barranquilla, Manizales, Cucuta) should promote more decisively and/or continue with the strategies that incorporate disaster risk management in planning, actions, and municipal or district investments. It should be pointed out that Cali needs to implement a specific strategy to mainly manage seismic risk and floods. Likewise, Barranquilla has to do the necessary to manage its landslides and floods (specifically for the well-known streams). A Risk Management Plan that relies on essential financing for its development should be prepared and implemented by all of the cities analyzed. This plan should include actions to carry out effective risk management caused by natural and unintentionally human-induced phenomena. Also, the plan should incorporate activities in risk knowledge and its reduction, as well as disaster management.

4 Reduce flood and landslide risk through planning, investment, monitoring and control, and articulation of the different agents responsible for watershed management

Assign responsibility for hydraulic management of rivers and water bodies to a Government agency, and establish the roles and mechanisms of coordination of the different agents involved. It is necessary to define an authority responsible for the hydraulic management of the rivers, so that the entity can develop policies and standards, define roles and those responsible, and coordinate actions through a Standing National Advisory Committee for River Hydraulic Management¹¹. This Committee shall be responsible for providing technical advice to the competent authority, covering both official and private consultations, performing functions assigned by the research management and monitoring authority, organizing seminars and updating courses, and guiding and advising in flood studies.

Adopt regulations for flood and landslide control and management, including the definition of maximum acceptable risk¹² and technical standards for risk assessment and mitigation, and a strategy for its implementation, monitoring, and control. It is necessary to overcome existing environmental imbalances that cause increased susceptibility to floods and landslides, which requires adjusting and articulating policy, regulatory and institutional framework for environment, and risk management. This means that it is important to (i) standardize acceptable risk parameters in order to establish technical standards for the execution of hazard zoning maps for land use planning purposes; (ii) review the criteria establishing urban and rural protection zones; (iii) set minimum guidelines for the design and construction of less

vulnerable buildings and structural measurements for flood control and flood mitigation; and (iv) establish responsible roles and their implementation, monitoring, and control mechanisms.

Understand in depth the role of risk management and its links to environmental management, development management, and climate change adaptation to incorporate them in the decision-making process at the sectoral and territorial levels. This requires guideline and action definitions to clarify responsibilities and the scope in each subject to avoid the overlapping of roles that do not match in terms of ecosystems, watersheds, and government entities.

Regulate the inclusion of a Master Plan for Flood and Landslide Control as an integral part of the POMCA. By nature, basins are the regional territorial units, bordered by the dividing lines between them. Comprehensive understanding of the hydrological system that shapes it, planning according to its use and occupation, and the definition of constraints and potentials for its territory, of-

11 The Standing Advisory Committee for Hydraulic River Management, like the Standing Committee on Seismic Resistant Standard, may be composed of one representative from the Presidency of the Republic, Ministry of Housing, Cities, and Territory, Ministry of Environment and Sustainable Development, Ministry of Transportation, Ideam, IGAC, Colombian Engineering Society, Colombian Association of Hydraulic Engineers, Asocars, plus a representative of the Governors' Offices, and a representative of the academia.

12 Acceptable risk is one that the community is willing to take on to change a certain rate or level of benefits. In the design of engineering works, it has been common to use this concept implicitly, in order to achieve a level of protection and security to justify the investment, considering as reference the useful life of the work. For such purpose, safety factors are used, which in probabilistic terms, cover "reasonable" uncertainty of the possible magnitude of external actions, the imprecision of the analytical modeling, and approximation of the simplifying assumptions (Cardona, 1990).

fer valuable input for its adequate protection and utilization. It is then recommended that a Master Plan for Flood and Landslide Control should be included as an integral part of the POMCA, which would make it possible to establish the necessary actions and investment requirements to prevent the generation of new risks and reduce those that already exist. The development of this Plan provides, as an environmental determinant for the municipal POT (Decree 1729 of 2002, Article 17), the possibility of regulating land use and determining the programs and projects that should be introduced in order to execute appropriate local risk management. The Master Plan should include, among other aspects, the following: (i) reduction and risk management as an integral part of the goals and objectives to ensure watershed safety and sustainability; (ii) definition of the scope and orientation with state-of-the-art zoning methodologies based on hazard assessments, in case of low-, medium-, and high-probability phenomena. Likewise, definition of the risk maps to show the possible effects of floods, thus determining the number of people and types of economic activities that could be affected, as part of this diagnosis¹³; (iii) regulation of restrictions and constraints of land use for each area under hazard/risk, (iv) formulation of penalties for noncompliance; and (v) list of programs and projects for risk reduction and control, protection of human lives, economic activities, ecosystems and cultural heritage, as well as the people responsible, funding mechanisms, and the strategies for their implementation and monitoring.

Accelerate the formulation and implementation of POMCA and their incorporation as a determining instrument in municipal POT. Taking into account that POMCA are instruments that incorporate comprehensive knowledge of the basins and define

the actions and interventions for their proper management, it is urgent to hasten their formulation in order to generate the required guidelines for updating and implementing the local POT, thus promoting coherent planning between the regional vision of the basins, flood control measures, and the restrictions and constraints in land use and occupation of each municipal jurisdiction.

Implement a strategy to strengthen the livelihood of the population in pursuit of poverty reduction. Changes in population and property vulnerability are highly dependent on the development stage and the socio-economic characteristics of the population. The link between poverty and susceptibility to natural disasters is increasingly acknowledged, so the country should move forward in developing effective strategies for reducing poverty, including implementing a rural development policy, investing in natural resource management, developing infrastructure, generating livelihoods and social protection mechanisms to reduce vulnerability, and enhancing resilience of rural livelihoods.

13 In this regard, examples from some European Countries, USA, and Japan can be found at http://ec.europa.eu/environment/water/flood_risk/flood_atlas/pdf/handbook_goodpractice.pdf (Handbook of Good Practices in Flood Mapping).

Box 3. Disaster risk, poverty, and development

Although the smallest and low-income municipalities, in absolute terms, do not necessarily have the greatest economic losses associated with disasters, they are socioeconomically the most vulnerable to natural hazards, and have the most difficulties in recovering without external help. Data of losses incurred during the last decade, normalized by the size of the municipal population, indicate that both destroyed houses and loss of life are focused on territorial entities between 10,000 and 50,000 inhabitants. Small municipalities with higher percentages of UBN¹⁴ (Pacific and Caribbean coasts, Eastern Plains, Amazonas, and the south of the country with 76% of population with UBN) have the lowest basic health infrastructure, the lowest levels of education and health, and in general, the most deficient infrastructure in production and services as well as insufficient institutional capacities, being more vulnerable and less resilient to risk and disaster conditions.

In addition to the inequality in social and economic processes, the environmental imbalance also leads to the creation of new conditions of vulnerability and increase the existing ones. Susceptibility to floods, landslides, and flash floods in these areas in Colombia has grown because of deforestation, soil erosion, and inadequate occupation processes. Vulnerability factors (physical, political, economic, etc.) are also increasing in rural areas where there is a disarticulated implementation of production systems to the territory's characteristics that determine land use conflicts. This can be evident in municipalities with high percentages of people with UBN, scarce development, and a dense rural population, where there are obvious high levels of environmental degradation.

Relative risk ratios¹⁵ to GDP facilitate the identification of areas (municipalities and departments), where the major potential losses are concentrated in relation to infrastructure and economic production exposure, especially in major cities (Bogota, Medellin, Cali, and Barranquilla) located in high- or medium-hazard areas threatened by landslides and floods. Additionally, the Andean region has the highest percentage of urban population, which contributes to a significant increase in vulnerability factors that add to the presence of several types of hazards that converge and result in great losses.

Source: OSSO Corporation, 2011.

5 Reduce risk generation and disaster impact through policies and sectoral action plans

Appoint a unit responsible for disaster risk management in each sector. It is necessary to define sectoral units or civil servants with clear responsibilities and hierarchy to coordinate the creation of the specific risk management policies and lead their implementation, as prescribed by Decree 919 of 1989. These units could also coordinate subjects such as climate change and environmental sustainability in each sector, simplifying the articulation of these spheres within each Ministry and among themselves. In addition, it would facilitate the adoption of multipurpose policy instruments, strengthen the sectors' performance, and enhance local capacity to implement instruments such as the POMCA, the POT, and the PD.

Implement sectoral policies for risk management in each Ministry. The sectoral approach to risk management has been largely reactive and protectionist, resulting in a steady increase in the vulnerability and disaster occurrence impacts in all spheres. This can be ap-

14 The indicator more used in Colombia to measure poverty corresponds to the Unsatisfied Basic Needs Index (UBN), which captures the fragile conditions of the population in terms of the physical characteristics of housing and resilience in relation to economic characteristics.

15 The Relative Risk Index was defined as the result of the GDP of the municipality exposure to different levels of hazards, according to the following equation: $IRr = GDP \times E(A)$, where IRr is the Relative Risk Index, GDP is the indicator of the goods and capital concentration, and E(A) is the exposure to different hazard levels. According to this indicator, municipalities with high GDP and high exposure to hazard also tend to have potential for more economic losses.

proached with a comprehensive policy, which also ensures assessment and knowledge about risk and the reduction of existing risk. It also eliminates the generation of new risks in projects and investments, and ensures effective and timely disaster response, promoting joint and shared responsibility with territorial entities and the private sector. This strengthens risk knowledge, especially in vulnerability studies in each sector. Better strategies can be designed for reducing physical, operational, and financial risk, and for properly planning management. It is essential to generate local capacity for specific sectoral risk management actions and mechanisms for coordination with local authorities. Sectoral risk management should also include institutional strengthening and risk reduction cofinancing, in order to meet the sectors needs while promoting responsibility and in this manner achieving a synergy among the different levels of government. On the other hand, it is also essential to embrace the private sector in these policies with the aim of accompanying and providing risk management knowledge and responsibility. Guild organizations are able and willing to play a deciding role in this field. The PND 2010-2014 aims to create a National Disaster Risk Management Policy and some of the sectoral Policies in this subject, which would become elements of Sectoral planning with special emphasis on “Engines for growth and employment generation” such as transportation, housing, mining and energy, and agriculture. Among the recommended sectoral policies, some priorities in the current PND are as follows:

- **Housing.** Intervention policies for settlements at risk, aimed at controlling and managing these settlements and reducing the construction of informal housing. The overall improvement of neighborhoods,

through risk analysis and the introduction of restrictions and constraints in the POT, development of projects to mitigate risk, family relocation in nonmitigable high-risk areas, additional urban land availability, increased VIS construction, and strengthened urban control.

- **Finance.** Financial protection policies to reduce the State’s fiscal vulnerability resulting from disasters, which define a differential strategy to address the needs of high-frequency/low-cost events, as well as low-frequency/high-cost events, transferring the risk as far as it is economically reasonable, constituting a reliable source of resources to address the retained risk, and encouraging participation of local governments and private actors.
- **Agriculture.** Comprehensive policies to face natural phenomenon risks, market risks, and risks associated with climate change, where strengthening of risk knowledge, risk reduction, and disaster management is comprehensively observed.
- **National Unit for Disaster Risk Management.** Low- and medium-intensity risk management policies and mechanism policies to guide reconstruction processes in a declared national disaster situation.
- **Drinking Water and Sanitation.** A policy to incorporate risk management in the rendering of public services in water supply, sewerage, and sanitation, for which there is a draft document that has not yet been formally adopted.
- **Transportation.** Contracting policies and concession management that incorporate criteria for disaster risk reduction.

Adopt and implement Sectoral and Inter-Ministry Action Plans on risk management. Once Sectoral Policies are implemented, the Sectoral and Inter-Ministry Action Plans would be

come their application instruments. These plans could define short- and long-term strategic priorities, and identify funding and development mechanisms. The objectives of risk knowledge and reduction, and disaster management mentioned in the policies should be reflected in the strategies, programs, and action plans' projects, as well as when assigning those responsible and in the coordinating, financing, monitoring and control mechanisms, addressing the needs and promoting the responsibility of territorial authorities and private sector agents. Some specific actions recommended to be included in these plans are as follows:

- **Land Use Planning.** Promote a partnership to support local entities in incorporating risk management within their territorial planning and providing equal priority to the rural and urban areas. This would enable confronting the municipalities' technical and financial capacity limitations and the application of sectoral policies to the territory.
- **Transportation.** Develop the Vulnerability Reduction Program in the different means of transportation. Roads should be a priority, since they currently have the highest risk levels. Establish a solid program to invest in existing risk reduction, focusing on critical road sections, either with stabilization work and/or with improving the standards of alternate routes. Also update technical specifications and contracting systems that should include the definition of acceptable risk levels. Evaluate projects from the prefeasible stage, also design methods and construction, operation, monitoring and control systems, all to establish the risk profile and strengthen road maintenance.
- **Housing.** Promote the Settlement Risk Reduction Program, which includes the definition of inventory methodologies, capacity strengthening, cofinancing, and technical assistance to the municipalities' census of endangered population. Implement the Comprehensive Neighborhood Improvement Policy. Adopt a strategy to control risk resulting from informal urbanization, which may include affordable housing alternatives such as leasing for lower strata, and training in construction. Formalize self-construction of one- and two-story houses to intercede in the process of building informal housing. Adopt acceptable risk levels for residential buildings facing floods and landslides, much as they are implemented in seismic risks.
- **Drinking Water and Sanitation.** Implement the RAS Risk Management chapter, including approval of acceptable¹⁶ maximum risk levels, infrastructure risk assessment, reducing existing risk, and the design and construction parameters in accordance with the standards set for new infrastructure. In regard to the fee structure, incorporate crossed feasibility for financing risk management activities, including vulnerability studies, risk reduction criteria maintenance, and the ability to secure the infrastructure.
- **Education.** Establish a capacity-strengthening program and cofinancing to support territorial entities in compliance with Ministerial Directive No. 12 dated July 2009, both to reduce educational infrastructure risk, and to increase preparedness to face emergencies.
- **Health.** Strengthen and expand Hospital Insurance program coverage.
- **Energy.** With the environmental sector, articulate the inclusion of flood risk management criteria in dam operation protocols, starting with adopting maximum acceptable risk levels.

¹⁶ Risk of service suspension for natural event disasters.

- **Environment.** Strengthen the inclusion of risk management in the POMCA, adopting maximum acceptable risk levels for all hazards and the definition of restrictions and constraints that should be reviewed and detailed in the planning processes such as the POT. Include in the POMCA a Master Plan for Flood Risk Reduction, ensuring articulation between different actors in watersheds and verifying that the risk reduction investments are consistent and positive for the entire area, not just a part of it.
- **Agriculture.** Organize with the agrarian guilds the implementation of a program to encourage small and medium farmers to use risk reduction measures and to adapt to climate change. This includes a collective and aligned effort with the Ministry of Environment and Sustainable Development to promote sustainable land management through planning and applying environmentally adequate production technologies, erosion prevention, and flood control. Likewise, risk reduction strategies are recommended. Using drought- or flood-resistant varieties, weather forecasts to make decisions during the production cycle, and early warnings about El Niño and La Niña phenomena are recommended strategies when deciding on product types, sowing seasons, and planning any livestock relocation. Along with the environmental sector, implement a joint strategy for recovering marsh areas where flooding occurs as areas to buffer floods.
- **All Sectors**
 - a. Implement a decision-making strategy in each sector through strategies aimed at providing information and knowledge on hazards, infrastructure vulnerabilities, property exposure, early warnings, and climate change. Vulnerability assessment and the risks to each sector allow each authority to formulate their own risk reduction plan. Actions and investments based on where hazards are concentrated and a cost-benefit analysis should be a priority. Hazard exposure, susceptibility, and damage assessment methodologies as well as assigning responsibilities and deadlines have to be adopted. It is important to consider not only present scenarios, but also future ones in which aspects such as demand growth, infrastructure aging, and climate change are taken into account. It is also convenient to encourage sectoral information and knowledge needs by strengthening the financial and technical articulation among CMS, IGAC, Ideam, DANE, and academic sectors.
 - b. Develop sectoral strategies in order to create accountability and risk management culture among private actors in each sphere. These strategies may include awareness and training campaigns encouraging responsibility of the private agents in this subject and alternatives to reduce, manage, and prepare to act in case of an emergency. Drills and simulation exercises are used to evaluate and improve the proposed actions, and contribute to increasing the level of awareness. Guild organizations in each sector can be a key ally in this endeavor.
 - c. Implement a strategy for disaster management in each sector, articulated and supported by the UNGRD and the National Calamity Fund (FNC). The formulation of public policies on “Minor and medium-intensity disaster management” and “Mechanisms for guiding reconstruction processes in a declared national disaster

situation” have been assigned by the current PND to the UNGRD, with support from the DNP. Experiences such as those in Mexico demonstrate the advantages of each Ministry in monitoring its own infrastructure rehabilitation and reconstruction process. This experience demonstrates: opportunity, independence, technical expertise, monitoring, and control. Transparency and efficiency are guaranteed by

using standardized and established procedures to assess damage, access to resources by Government agencies and the private sector, and mechanisms for monitoring and control. However, the Oil Spill Contingency National Plan experience and its replication to other sectors should be assessed, and probably should be extended to contingency plans for each of the hazards.

6 Delimit public and private responsibilities in risk management and deepen the State’s fiscal vulnerability policies in facing disasters

Adopt clear policy guidelines on the protection level that the National Government and territorial entities should offer to those affected by hazardous events. The Government should assess its ability to support people affected by a disaster, and decide in advance of upcoming events a policy defining the government’s expected response. It is also important to establish the levels of responsibility of the Central Government and territorial entities to promote joint responsibility based on subsidiarity and complementarity principles. Therefore, financial provisions required to meet obligations to those affected can be estimated. Additionally, clear policy implementation in the above matters and their disclosure shall allow citizens to know to what extent the Government will be responsible in the event of a disaster. In turn, with this knowledge, citizens will be encouraged to take responsibility for their own risks and take measures in risk prevention, mitigation, or risk transfer, according to their particular situation. Searching for coherence and integrity, this policy should

consider the following elements: (i) the characteristics to describe and catalog the affected people as “manifesting weakness” (e.g., the condition of belonging to the poorest group of people -strata 1 and 2- has been used frequently); (ii) protection offered to those affected and catalogued as “manifesting weakness” and support to others affected; (iii) tax, financial, and other incentives to mitigate losses in the productive sector; and (iv) tax, financial, and other incentives to promote economic recovery.

Adjust regulations to clarify the private sector’s responsibility in disaster risk management, and strengthen the defense of public entities to reduce the State’s fiscal contingencies produced by the demands of those affected. A clear definition of responsibility of the private sector will strengthen the defense of public entities in the courts. Additionally, specific guidelines to facilitate the proper integration of risk management in governance will reduce vulnerability and losses caused by State actions. The regulation adjustments could include:

- Regulation containing detailed provisions on exclusive, solidarity, or complementarity concurrence of each of the participants who may be responsible for the disaster impacts: (i) public entities by act or omission; (ii) private actors that as part of their production activities generate risk, consciously or unconsciously; and (iii) victims or affected people who, consciously or unconsciously, have decided willingly or unwillingly to assume the risks that later are materialized into disasters. This regulation will help to face the fact that most judicial complaints in risk management are addressed against public entities, although in many cases, there is third-party intervention or participation, whether it is private or public, or even if the affected plaintiff is an excluding or reducing circumstance of the State's responsibility. Absence of rules generally leads to establishing responsibility almost exclusively of public entities, affecting their economic or budgetary conditions. Therefore, a careful and meditated legal reform is advisable. In judicial proceedings against the State, whether they be general, contentious, administrative, or protective, the reform will enable both plaintiff and as judicial courts to call to the proceedings other possible risk event generators, whether they be private or public entities. This possibility shall open the space to define if there are excluding, solidarity, or concurrent conditions of responsibility in favor of the State, and also the possibility of filing judicial actions against public servants accountable for their actions.
- Regulations stating, as clear as possible, the functioning fields of competence of public entities in risk management. An important aspect in legal disputes over State's responsibility is the definition of the content, scope, and limits of the powers that correspond to each of the public entities involved directly or indirectly in risk management. Thus, it is imperative that the law governing the subject is especially clear when it comes to processes in which sequentially different government agencies participate.
- Regulations precisely setting out the ways to establish and derive State and private responsibility and as far as possible eliminate the uncertainty of the judicial interpretation. There is a need for legal regulations that define the ways to establish State responsibility with all the requirements and conditions. Jurisprudential and doctrinal interpretations may be used, but considering that in terms of risk management, there are both public and private factors that establish the concurrence of responsibility among multiple entities. This will determine, for example, that in case of intent or grave fault by a private agent in its responsibilities in facing risk, this agent should assume the entire cost of damages incurred.
- Legislation which confirms and clarifies the responsibility for the construction's physical protection. Advance towards a regulation that will establish responsibility for Urban Curators and that upon issuing the license or authorization acts, will require the compliance of technical construction standards as set forth in Decree 564 of 2006, Article 49, and the provisions of Act 400 of 1997, Decree 33 of 1998, and other decrees.
- Mandatory legal rules regarding financial protection applied to both public and private sectors, assessing cases in which individuals may be forced to define insurance strategies or other financial protection mechanisms similar to those existing for regulations of common areas in condominiums.

- Modification in the Statutory Law of civil rights and obligations in risk reduction and management. Assigning citizens the responsibility of knowing and managing the risk they are exposed to due to the probability of a natural disaster occurrence.
- Other regulations related to the public administration sector such as (i) analyzing the risks and alternatives from the projects' prefeasibility, incorporating the subject in the BPIN norms; (ii) regulating concession contracts and in particular complying with Conpes 3107 of 2001, assigning responsibility to the private investor for natural event disaster risk management, as a transferable risk through insurance policies or other financial instruments; (iii) stipulating technical regulations for each sector, for example, updating bridge codes and tunnel regulation; finalizing the implementation process of the Risk Management Chapter found in the Technical Regulations for Drinking Water and Sanitation Sector (RAS), among others; and (iv) articulating strategies in the agriculture, mining, and environmental sectors to regulate and apply the recent Environmental Sanctioning Regime in the illegal activities of deforestation, desiccation, wetland invasion, alteration of a river's course, etc.

Design and implement an integral strategy for the financial security of the State at the sectoral and territorial level with the purpose of guaranteeing an adequate response when there is a disaster and protecting the country's financial balance on a long-term basis. Endorse a financial protection strategy so that it will at least be able to provide annual resources to cover disasters that may take place during the course of the year high-frequency/low-cost and low-frequency/high-cost), even though there is

not enough information to reliably assess the needed amounts. In any case, the estimate of these resources depends on the definition of the State's responsibilities and how efficiently these are executed. In addition to the Central State's strategy, it would be convenient to promote risk management funds and financial protection strategies at the sectoral and territorial levels (municipalities and departments).

Clarify, from the regulations, the procedures and mechanisms as to how private agents participate in the different phases of risk management. The current System anticipates the intervention of private agents in risk management, but with insufficient development and lacking the conditions to apply it. This clarification could include, among others, the following elements:

- Obligations of private and public agents in the preventive phase, as referred to in Articles 8 and 9 in Decree 919 of 1989, or in dealing with the results of damages that have not been used, with the exception of the partial development that Bogota¹⁷ has had.
- Specific modifications in risk management in the Citizen Participation in Statutory Law, taking into account that every individual should "act in accordance to the principle of social solidarity and responding with humanitarian actions to situations that may endanger life or health of the population" (numeral 2, Article 95 CP).
- Design and implement a strategy where the State, the insurance sector, and the private sector are included in order to reinforce insurance penetration in Colombia. This should be done in order to increase insurance coverage

17 Decree 332 of 2004, which organizes the regime and the system for prevention and emergency assistance in Bogota.

among individuals as well as coverage in the private sector. The strategy may include State incentives, but the insurance sector should be responsible for increasing and offering the availability of its products.

Promote and incentivize municipal and sectoral strategies to make the population aware of and competent in risk management.

Take advantage of the citizens' readiness to contribute and increase awareness and knowledge levels in risk management using cost-effective measures to reduce risk to the country, which the State can implement through:

- Developing awareness campaigns, mainly in those cities that have high-risk levels versus those where hazards are scarce. Likewise, in cities or towns where these risks are more frequent, strengthen the appropriation level

of the campaigns. Clarify public and private responsibility, especially in evaluating vulnerability in each home and disclosing clear and effective risk reduction recommendations.

- Implementing risk management programs jointly with the community. These should have real and sustainable impacts and include risk prevention strategies and disaster preparation (drills and brigades). They have to achieve effective risk reduction so that the participants will have a greater awareness and knowledge of their risks.
- Accompanying the guilds in designing risk management strategies to inform and train their members, promote measures to mitigate existing risks, and reinforce coordination in decision making. Thus, the guilds can influence their members on how to reduce and consequently mitigate risk in the sector and in the country as a whole.

TABLE 1. Recommendations to strengthen governance in the field of disaster risk in Colombia

RECOMMENDATION	RESPONSIBLE ENTITY	RELATION TO THE GOALS IN THE NATIONAL DEVELOPMENT PLAN 2010-2014
<i>1. Incorporate risk management as a State policy and overcome existing imbalances in the System through the adjustment and harmonization of a regulatory and institutional framework</i>		
Adopt a national policy in disaster risk management that is integrally articulated with public administration, provides support to the territorial entities, and promotes the creation of specific policies and sectoral action plans.	Presidency, DNP, UNGRD, with support of National Committee of Disaster Prevention and Assistance/GRD	Guideline: Governance best practices
Create a risk management statute to harmonize the current legislation addressing the gaps identified in defining public and private responsibilities.	UNGRD with the support of National Committee for Disaster Prevention and Assistance/GRD	Goal of the process: Formulate and adopt a National Policy in Disaster Risk Management, and update the regulation framework and management instruments of SNPAD.
Reorganize the System by strengthening technical and financial management capacity of the different territorial levels and including the participation of the private sector.	Presidency, DNP, UNGRD with the support of the National Committee - PAD/GRD	Goal of the process: Design second phase for the State's Fiscal Vulnerability Reduction Program in facing Disasters.
Give priority to strategic orientation, technical leadership, authority, and control among the functions performed by the National Unit for Disaster Risk Management (UNGRD) as the head of the System.	Presidency	Goal of the process: Formulate a policy for the reconstruction process of a declared national disaster situation.
<i>2. Increase the effectiveness and efficiency of risk management investment through strategic planning, coordination among territorial levels, and monitoring and control</i>		
Promote the adoption of the Territorial Risk Management Plans (PTGR) as long-term instruments to guide the POMCA, POT, and PD, and articulate public and private investments.	DNP, UNGRD, MADS, MVCT	Guideline: Governance best practices
Establish a national cofinancing (fund) mechanism to encourage investments in disaster risk management and generate capacities at regional and sectoral levels.	UNGRD, MHCP, DNP	Goal of the Outcome: Improve technical capacity of the territorial entities and the CAR in disaster risk management.
Adopt risk reduction goals in policies and plans, and ensure compliance through progressive implementation of results-based strategic planning.	UNGRD, DNP	Guideline: Risk control and reduction
Strengthen the mandatory incorporation of criteria in disaster risk management when formulating public investment projects.	DNP	Goal of the process: Define and incorporate risk management criteria in the formulation of national public investments projects.
Adopt a monitoring strategy for following up on responsibilities and investments for risk management at different territorial levels.	Presidency, UNGRD, DNP	
<i>3. Strengthen local capacity in territorial management in order to reduce the causes and accumulation of disaster risks</i>		
Adopt a national strategy to strengthen municipal risk management that takes into account the differences in capacities.	Presidency, DNP, UNGRD, with the support of the National Committee - PAD/GRD, Departmental governments	Guideline: Governance best practices
Structurally review the deficiencies in the capacities to assess disaster risk in order to provide an effective response to the knowledge demand for the POT and the PD.	DNP, UNGRD, MVCT, MADS Ideam, SGC, IGAC, DANE, CAR, Colciencias, Governors' Offices	Guideline: Improve risk knowledge
Strengthen the departmental governments' capacities in coordinating municipalities, defining their competencies in disaster risk management according to the principles of concurrence, and subsidiarity capacities, as established in the Constitution, and the possibilities offered by the Organic Land Use Planning Law.	Presidency, DNP, UNGRD, with the support of the National Committee - PAD/GRD, Departmental governments	Goal of the process: Design and implement methodological instruments for hazards, vulnerability, and risk zoning in the municipal sphere.
Design and implement the PTGR as instruments which orient and give priority to interventions and investments in municipalities and departments.	City Halls and Departmental governments	Goal of the process: Modernize the Integrated Information System for Disaster Prevention and Response.
		Goal of the Outcome: Expand monitoring networks and early warning, and update hazard maps.
		Guideline: Governance best practices
		Goal of the Outcome: Improve technical capacity of the territorial entities and the CAR in disaster risk management.
		Guideline: Governance best practices
		Goal of the Outcome: Strengthen technical capacity of territorial entities and the CAR in disaster risk management.

TABLE 1. Recommendations to strengthen governance in the field of disaster risk in Colombia (continued)

RECOMMENDATION	RESPONSIBLE ENTITY	RELATION TO THE GOALS IN THE NATIONAL DEVELOPMENT PLAN 2010-2014
Formulate and implement the national policy in the intervention of settlements at risk that set the guidelines for land zoning, and define mitigation criteria and action strategies.	DNP, UNGRD, MVCT, MADS	<p>Guideline: <i>Governance best practices</i></p> <p>Goal of the process: Formulate a policy for risk settlement intervention.</p> <p>Guideline: <i>Improvement of disaster risk knowledge</i></p> <p>Goal of the process: Design and implement methodological instruments for hazards, vulnerability, and risk zoning in the municipal sphere.</p>
Reduce the amount of housing in high-risk areas by implementing integral neighborhood improvement and family resettlement programs from nonmitigable risk areas.	DNP, UNGRD, MVCT, MADS	<p>Guideline: <i>Governance best practices</i></p> <p>Goal of the process: Formulate a policy for risk settlement Intervention.</p>
Promote and continue the efforts carried out in the cities (case studies) for cross-cutting inclusion of disaster risk management in planning and municipal investments as a fundamental strategy in land development.	DNP, Municipalities, Departmental governments	<p>Guideline: <i>Risk control and reduction</i></p> <p>Goal of the process: Define and incorporate risk management criteria in the national public investment project formulation.</p>
4. Reduce flood and landslide risk through planning, investment, monitoring and control, and coordination of different agents responsible for watershed management		
Assign responsibility for hydraulic management of rivers and water bodies to a Government agency, and establish the roles and mechanisms of coordination of the different agents involved.	Presidency, DNP, MADS, MT	<p>Guideline: <i>Governance best practices</i></p> <p>Goal of the process: Formulate policy for recurrent disaster management.</p>
Adopt regulations for flood and landslide control and management, including the definition of maximum acceptable risk and technical standards for risk assessment and mitigation, and a strategy for its implementation, monitoring, and control.	MADS, Permanent Committee created for hydraulic management of rivers and water bodies	<p>Guideline: <i>Improvement of disaster risk knowledge</i></p> <p>Goal of the process: Formulate a strategy for strengthening risk management research.</p>
Understand in depth the role of risk management and its links to environmental management, development management, and climate change adaptation, to incorporate them in decision making at the sectoral and territorial levels.	Presidency, DNP, UNGRD, with the support of National Committee- PAD/GRD	<p>Guideline: <i>Improvement of disaster risk knowledge</i></p> <p>Goal of the process: Formulate a strategy for strengthening risk management research.</p>
Regulate the inclusion of a Master Plan for Flood and Landslide Control as a comprehensive part of the POMCA.	MVCT, MADS, Ideam, with the Permanent Committee created for hydraulic management of rivers and water bodies	<p>Guideline: <i>Governance best practices</i></p> <p>Goal of the Outcome: Strengthen the technical capacity of territorial entities and the CAR in disaster risk management.</p> <p>Guideline: <i>Improvement of disaster risk knowledge</i></p> <p>Goal of the Outcome: Expand monitoring networks and early warning systems, and update hazard maps.</p>
Accelerate the formulation and implementation of POMCA and their incorporation as a determining instrument in municipal POT.	MADS, CAR	<p>Guideline: <i>Governance best practices</i></p> <p>Goal of the Outcome: Strengthen the technical capacity of territorial entities and the CAR in disaster risk management.</p>
Implement a strategy to strengthen the livelihood of the population in pursuit of poverty reduction.	DNP, Municipalities, Departmental governments	<p>Guideline: <i>Risk control and reduction</i></p> <p>Goal of the process: Define and incorporate risk management criteria in the national public investment project formulation.</p>

TABLE 1. Recommendations to strengthen governance in the field of disaster risk in Colombia (continued)

RECOMMENDATION	RESPONSIBLE ENTITY	RELATION TO THE GOALS IN THE NATIONAL DEVELOPMENT PLAN 2010-2014
<i>5. Reduce risk generation and disaster impact through policies and sectoral action plans</i>		
Appoint a unit responsible for disaster risk management in each sector.	All Ministries	Guideline: <i>Governance best practices</i>
Implement sectoral policies for risk management in each Ministry.	All Ministries	Goal of the process: Formulate and adopt a National Policy on Disaster Risk Management, plus update the SNPAD regulatory framework and management instruments. Goal of the Outcome: Strengthen the technical capacity of territorial entities and the CAR in disaster risk management.
Adopt and implement Sectoral and Inter-Ministry Action Plans on risk management.	All Ministries	Goal of the process: Formulate a policy for recurrent disaster management. Guideline: <i>Improvement of disaster risk knowledge</i> Goal of the process: Formulate a strategy for the strengthening of risk management research.
<i>6. Delimit public and private responsibilities in risk management and deepen the State's fiscal vulnerability policies in facing disasters</i>		
Adopt clear policy guidelines on the protection level that the National Government and territorial entities should offer to those affected by hazardous events.	Presidency	
Adjust regulations to clarify the private sector responsibility in disaster risk management, and strengthen the defense of public entities to reduce the State's fiscal contingencies produced by the demands of those affected.	All Ministries	Guideline: <i>Governance best practices</i> Goal of the process: Design a second phase for the Government Fiscal Vulnerability Reduction Program in facing disasters.
Design and implement an integral strategy for the State's financial security at the sectoral and territorial level with the purpose of guaranteeing an adequate response when there is a disaster and protecting the country's financial balance on a long-term basis.	MHCP	Goal of the process: Formulate a financial protection strategy in facing disasters. Goal of the process: Formulate a policy for recurrent disaster management.
Clarify, as far as regulations, the procedures and mechanisms of how private agents participate in the different phases of risk management.	Presidency, UNGRD, DNP, Ministries	
Promote and incentivize municipal and sectoral strategies to make the population aware of and competent in risk management.	UNGRD, Ministries, Territorial entities	Guideline: <i>Improvement of disaster risk knowledge</i> Goal of the process: Implement a National Plan for Training and Education on Risk Management.

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ACRONYMS

Asocars*	Association of Regional Autonomous Corporations of Sustainable Development and Environmental Authorities of Large Urban Centers. (Asociación de Corporaciones Autónomas Regionales, de Desarrollo Sostenible y Autoridades Ambientales de Grandes Centros Urbanos)
BPIN*	National Programs and Investment Projects Bank (Banco de Programas y Proyectos de Inversión Nacional)
CAF*	Andean Development Corporation (Corporación Andina de Fomento)
Camacol*	Colombian Construction Chamber (Cámara Colombiana de la Construcción)
CAR*	Regional Autonomous Corporation (Corporación Autónoma Regional)
CCI*	Colombian Infrastructure Chamber (Cámara Colombiana de la Construcción)
CCO*	Colombian Ocean Commission (Comisión Colombiana de Océano)
Conpes*	National Council for Economic and Social Policy (Consejo Nacional de Política Económica y Social)
DANE*	National Statistics Administration Department (Departamento Administrativo Nacional de Estadística)
DDTS*	Sustainable Territorial Development Office of the National Planning Department (Dirección de Desarrollo Territorial Sostenible del Departamento Nacional de Planeación)
DNP*	National Planning Department (Departamento Nacional de Planeación)
DRM*	Disaster Risk Management (Gestión del Riesgo de Desastres)
ECLAC*	Economic Commission for Latin America and the Caribbean (Comisión Económica para América Latina y el Caribe)
Fasecolda*	Colombian Federation of Insurers (Federación de Aseguradores Colombianos)
FNC*	National Calamity Fund (Fondo Nacional de Calamidades)
FOREC*	Coffee Growing Region Reconstruction Fund (Fondo para la Reconstrucción del Eje Cafetero)
GFDRR	Global Facility for Disaster Reduction and Recovery
Ideam*	Colombian Institute of Hydrology, Meteorology, and Environmental Studies (Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia)
IGAC*	Agustín Codazzi Geographic Institute (Instituto Geográfico Agustín Codazzi)
Invías*	National Roads Institute (Instituto Nacional de Vías)
MADR*	Agriculture and Rural Development Ministry (Ministerio de Agricultura y Desarrollo Rural)
MAVS*	Ministry of Environment and Sustainable Development (prior to 2011 Environment, Housing, and Territorial Development) (Ministerio de Ambiente y Desarrollo Sostenible)
MEN*	Ministry of National Education (Ministerio de Educación Nacional)
MHCP*	Ministry of Finance and Public Credit (Ministerio de Hacienda y Crédito Público)

MME*	Ministry of Mines and Energy (Ministerio de Minas y Energía)
MT*	Ministry of Transportation (Ministerio de Transporte)
MSPS*	Ministry of Health and Social Protection (before 2011 Social Protection Ministry) (Ministerio de Salud y Protección Social)
MVCT*	Ministry of Housing, Cities, and Territories (before 2011 Environment, Housing, and Territorial Development Ministry) (Ministerio de Vivienda, Ciudad y Territorio)
UBN	Unsatisfied Basic Needs
PDA*	Water Departmental Plan (Plan Departamental de Agua)
PND*	National Development Plan (Plan Nacional de Desarrollo)
PNPAD*	National Plan for Disaster Prevention and Response (Plan Nacional para la Prevención y Atención de Desastres)
POMCA*	Land Use and Watershed Management Plan (Plan de Ordenamiento y Manejo de Cuencas)
POT*	Land Use Planning (Plan de Ordenamiento Territorial)
PTGR*	Municipal Land Use Management Plan (Plan Territorial de Gestión del Riesgo)
RAS*	Technical Regulation for Drinking Water and Basic Sanitation (Reglamento Técnico para el Sector de Agua Potable y Saneamiento Básico)
SAC*	Agricultural Society of Colombia (Sociedad de Agricultores de Colombia)
SDAS*	Subdivision of Sustainable Environment Development of the National Planning Department (Subdirección de Desarrollo Ambiental Sostenible del Departamento Nacional de Planeación)
SGC*	Colombian Geological Survey (Servicio Geológico Colombiano)
SGP*	General Participation System (Sistema General de Participaciones)
SNPAD*	National System for Disaster Prevention and Assistance (Sistema Nacional para la Prevención y Atención de Desastres)
UNGDR*	National Unit for Disaster Risk Management (before 2011 Risk Management Directorate) (Unidad Nacional para la Gestión del Riesgo de Desastres)
UNISDR*	United Nations International Strategy for Disaster Reduction (Estrategia Internacional para la Reducción de Desastres)

***Acronym in Spanish**



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