ANDEAN CAPITAL CITIES 2007

REGIONAL CATALOGUE OF MUNICIPAL MANAGEMENT TOOLS IN **risk**

RISK REDUCTION AND EMERGENCY PREPAREDNESS

Bogota - Colombia

COMISION EUROPEA
Ayuda Humanitaria

PROYECTO REGIONAL DE REDUCCIÓN DE RIESGOS EN CAPITALES ANDINAS

ALCALDÍA MAYOR DE BOGOTÁ D.C.

PNUD

Regional Strengthening and Risk Reduction in Major Cities of the Andean Community

Catalogue of Municipal Management Tools in Risk Reduction and Emergency Preparedness in Andean Capital Cities

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Presentation

Bogotá is exposed mainly to natural hazards such as landslides, floods and seismic events. It is also exposed to non-intentional human caused hazards, forest fires for example, and structural hazards, technological accidents (toxic and fuel spills, gas explosions, etc.), and incidents taking place during the congregation of large masses. These events are common to the Andean region.

The manner in which the city has incorporated and articulated objectives aimed at risk reduction in the land use planning and public investment, imposes from the very beginning the fundamental development of a political, technical, economic and social process; in other words, a multi-dimensional and inter-sectoral program which has been favored by circumstances part of the Colombian context.

In 1987, the City Council created the Fund for Emergencies Prevention and Response (FOPAE), assigned with financing the creation of a disaster prevention large-coverage program, and endowed with an annual amount to be included in the district's budget, which can not be less than 0.5% of the current tax revenues of the Central Administration (8,000,000 USD per year approx.) Also, the Emergencies Prevention and Response Coordinating Department, was created to operate directly under City Hall (currently as a department under the Mayor's Management Office (Undersecretary of Government) responsible for coordinating the different public, private and community agents in charge of risk prevention and emergency response.

Risk reduction and emergency response in Bogotá has been a process that begins with a solid national regulation, the city's administrative independence and the creation and use of the Fund for the Prevention and Response to Emergencies. This fund required, during the last decade, the city's different administrations to define and program the investment of this fund in each Development Plan, therefore guaranteeing sustainability in those plans and programs aimed at risk management.

As a result, Bogotá has made substantial progress in the institutional, regulatory, organizational and technical development of this matter. A number of large investments have been made and important goals have been reached in the knowledge of threats, land use planning, mitigation works, relocation of high risk families, reinforcement of structures, education and community participation, and in the strengthening of the Emergency Prevention and Response District System, etc.

From a historical and comparative perspective, these achievements lead us immediately to recognize the particularities of Bogotá's process. Even though, during the last decade, the Development Plans of each different municipality have differed in their political and

administrative conception, it is important to underline how the prevention concept has become a practical matter overtaking response and mitigation.

During the past fifteen years, risk management as a concept of public policy has "found its place" within the city's political, institutional and legal organization. As a result of the management tools, processes and language created by Bogotá within the risk management environment, during 2006 the Emergency Prevention and Response District Plan (PDPAE) was adopted by decree, which constitutes the first long-term (10 years) planning instrument guiding, in a coordinated and articulate manner, the set of actions aimed at risk reduction and response to emergencies in Bogotá, in tune with the Land Use Plan and the Environment Management Plan.

The PDPAE recognizes the city's territorial and population particularities, organized by means of management scenarios to recognize the key actors, moments and spaces generating public risks, in political decisions and in the definition of planning tools.

This opportunity given us to share our management model with the four other cities, within the scope of the Risk Reduction Regional Project in Andean Capital Cities, sponsored by UNDP-BCPR and ECHO-DIPECHO, has been for us an important exercise. It has led us to review, put into perspective and promote our development based on the experiences of the other participating cities. It is our hope that this initiative will strengthen the establishment of communication channels and permanent discussion forums on common problems affecting the Andean region.

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Introduction 1

The project on Risk Reduction in Andean Capitals, sponsored by the UNDP-BCPR and ECHO-DIPECHO, is clearly the most important opportunity that our cities have had to discuss, share their knowledge and make the most of each others' experience to review, give relevance, confirm or encourage their own development.

This comparative perspective leads, as in any field of knowledge, to a historical appreciation of development and to a panoramic and systemic perspective of the current organisation, which broadens greatly the understanding each city has of its own experience.

For this reason, this has been a milestone for Bogotá as well as for the other participating cities. A moment in which everything that has been built is reviewed and in which the current unsafe conditions management is placed within an historical perspective and a clear idea of what should be better used or what needs to be strengthened or constructed.

In the middle of a consuming and urgent day-to-day job, many of these elements can go unnoticed by the same people who helped to build them. Then the responses that are elaborated everyday and collected using own management methods, are

taken for granted. There is even the risk of forgetting the process that has lead to each concept or tool, and therefore, its value and the relativity of such value.

Some of the many elements are:

- The conception of risk as something that is built by society and that reflects imperfections of development.
- The vision of risk management as a comprehensive process beyond emergency preparedness and assistance.
- The emphasis on the prevention of socioeconomic processes that generate risk in the territory.
- The vision of the progressive construction and institutionalisation process of management elements.
- Systemic organisation of the institutions that have distributed tasks using a cross-cutting approach in different entities according to their respective functions, under a central coordination and with unified policy and planning.
- The continuous searching for the actors who generate and manage risk to assume effective responsibility of their actions.
- Financial provision and protection for the city in the event of a disaster.
- Rigorous methods of risk valuation and its inclusion in land planning.
- The organisation of management by scenarios that recognise socioeconomic networks of risk generation.
- The concept of management more as a social process than an institutional one that should include public, private and community actors.

All these are aspects that served as guidelines in many of the discussions during the projects and that make Bogotá, to some extent, a model for the other cities. A model, of course, that needs to be contextualised.

In fact, to see these achievements in an historical and comparative perspective, immediately leads us to recognise the particular characteristics of the process in Bogotá, a process of fifteen years or more that started from the solid basis of national regulations and autonomous administration of the city. This shows that in Bogotá, people have not only worked hard on these issues but have also taken the time to reflect and inform themselves on international developments in the area and to create solutions according to our resources and contexts. This process reflects where the issue has been placed at national and local levels, and to form a risk awareness culture in the political class and the institutions.

Direct and in-field exchange between the people who have been part of the construction, application and evolution of the concepts and tools in the five cities, has also allowed downplaying our own responses. That is, not seeing them as the only ones or the best possible ones, and to analyse to what extent they respond to the problem, to management limitations or to a particular way of viewing certain things.

The experience of the project generates recognition and self-recognition, important for Bogotá; but it also leaves a clear perspective on the insufficiency of everything that has been built, in the great accumulation of risk caused by the rapid development of our cities in the second half of the last century. Also, growing differences because of the unstoppable construction of new risks, of different degrees, as these cities continue to grow and become large metropolitan systems with socioeconomic and administrative situations that do not correspond to the process of institutional construction in the capital.

The scenario chosen by the project, informal settlements on the hillsides, as the analysis framework of risk management is precisely one of the most representative of the real situation of the problems and solutions in comprehensive risk management in our cities.

These scenarios, dominated by informality and poverty, cannot make us feel proud. Instead, they show us exactly how far we still need to go, a distance that increases every day, given the growing imbalances. The imbalance between problems and solutions is also the imbalance between the formal and informal city, between the centre and the outskirts, between the capital and nearby municipalities, between city and nation, between rich and poor, between people and nature, between the growing global economy and the desperation in the households.

This challenge is too big to be dealt with in an isolated way. The creation of a Thematic Network of Risk Reduction within the Andean Cities Network is the necessary result of the situation created by the project. In the network we can obtain more by adding up the little there is and transforming our achievements, and even our doubts and mistakes, into common capital. Networking will enable us to complete this ever-lengthening journey at a faster rate.

Characterising the Scenario 2

2.1. THE ENVIRONMENT

2.1.1. GEOGRAPHICAL FRAMEWORK

The City of Bogotá, Capital District, is strategically located in the geographical centre of the country, in the eastern sector of the Sabana de Bogotá plateau, at 2,630 meters above sea level. The urban area of Bogotá covers 30,736 hectares, of which 6,906 are illegally occupied.

The western border of the city is defined by the Bogotá River, the main waterway of the Savannah and of the city that flows towards the southwest. The eastern and southern borders form a mountainous chain that is part of the Eastern Mountain Range, with peaks higher than 3,700 meters above sea level in some areas. To the north it borders settlements on the Bogotá Savannah.

This city is formed by two geomorphologic zones, a flat area in the centre, north and west, where the majority of the population lives, where alluvial valleys and terraces of the Bogotá River and its tributaries predominate; and other mountainous areas located on the western (Cerros Orientales), south and south-eastern (localities of

Ciudad Bolivar and Sumapaz), and north-western (Cerros de Suba) sides. In the mountainous areas lie inhabited sectors, open mining exploitation (quarries, gravel pits and brick makers), and areas of environmental protection.

Bogotá is divided, politically and administratively, into twenty localities, and each one of them has Unidades de Planeación Zonal-UPZ (Planning Zone Units) formed by a group of neighbourhoods located in both urban and expansion areas.

The total population of the Capital District is 6,776,009 inhabitants, and the growth rate is 2.4% per annum[1]. Only a small percentage of the total population lives in rural areas of the district[2] (less than 20,000 inhabitants). Neighbouring municipalities add to the population of Bogotá, with more than 1,000,000 inhabitants distributed along the Savannah.

There is a great increase in the number of households due to their decrease in size, which, together with population growth as a result of migration, increase demand for housing[3].

Today, the only two directions of growth in the city are the south and the north, but these will soon run out of space. These two outskirts show a strong socioeconomic segregation with predominant occupation by people with low income in the south, and people with high income in the north.

The layout of the population in the territory is marked by a common to the big cities of the world: dynamic growth in the periphery and population reduction in central areas, due to the process of substitution of activities (dwelling being replaced by tertiary sector) or the obsolete state of old residential areas. This process has intensified in Bogotá in the last decades, and between 1985 and 1993, eighteen peripheral areas gained 962,709 people, while twenty central areas lost 103,801 inhabitants[4].

Since the 1960s the occupation of urban space in the city, mainly in peripheral areas, has been characterised by the illegal distribution of land, the lack of public services, the progressive development by self-construction, difficulties to access and connect with urban circuits, lack of public space and facilities for the community, poor quality housing and on top of all this, lack land titling.

This rapid and disorganised growth has caused the expansion of the urban perimeter towards higher areas on the surrounding hills, accelerating the occurrence of phenomena such as landslides, because of the pressure of the population on the areas that present high susceptibility, for example quarries, slopes in rivers and

1. Census DANE, 2005.

2. The official statistics of the city do not give a number for rural population who live in the Locality of Sumapaz because it was not included in the census of 1993. An approximate number of the rural population is 30,000 inhabitants.

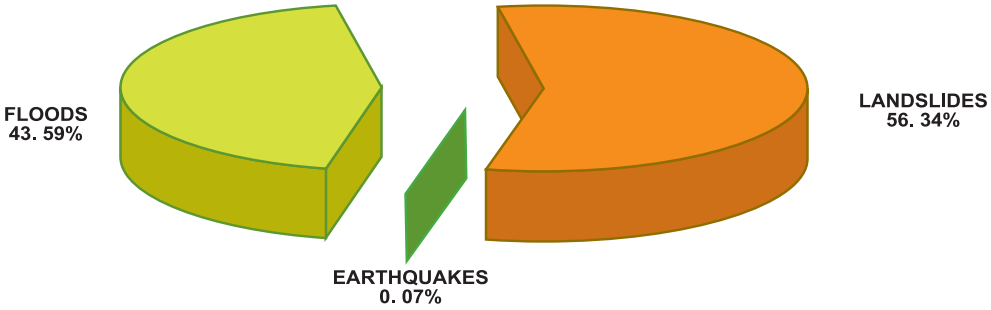
3. Zoning Plan of Bogotá. Supporting Technical Document.

4. Zoning Plan of Bogotá. Supporting Technical Document.

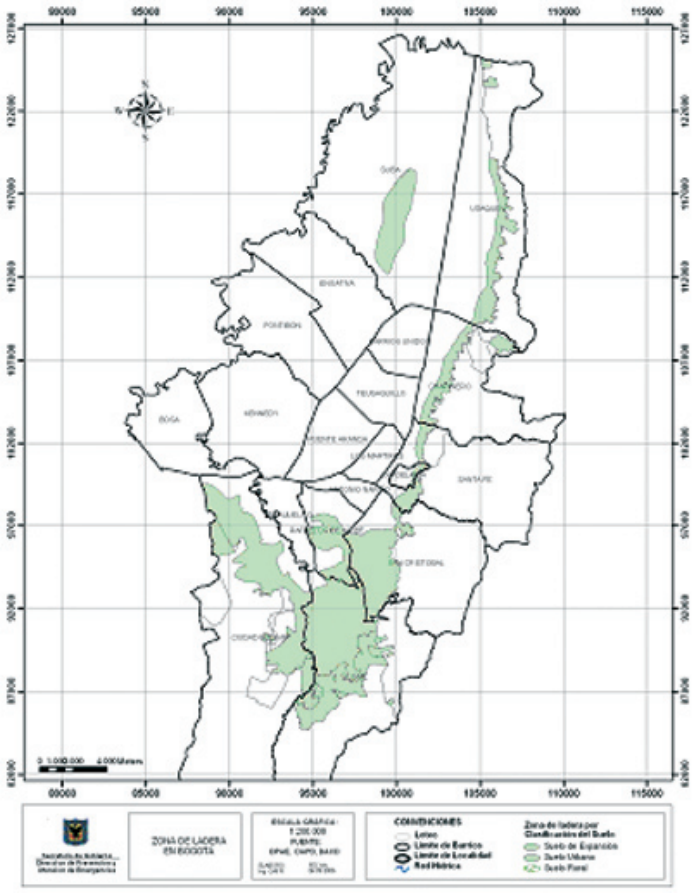
ravines, steep slope areas, man-made fill, and dumpsites, where town-planning activities have been carried out without any technical control or planning, and inadequate cuts on slopes or non-technical landfills.

All this is reflected in the statistics of the main events occurred in Bogotá D.C. during the period from 1943 to 2006, where the greatest percentage corresponds to phenomena of landslides (56.34%), followed by floods (43.59%), and to a lesser degree earthquakes (0.07%). See Graphic 01.

GRAPHIC 01 EVENTS OCCURRED IN BOGOTA DURING THE PERIOD FROM 1943 TO 2006



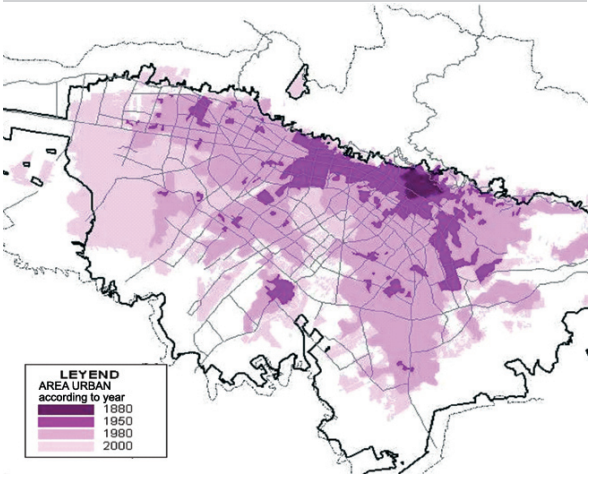
GRAPHIC 02 AREAS ON THE HILLSIDES OF BOGOTA



The urban perimeter of Bogotá comprises around 42,000 hectares. Towards the west and north, across the Bogotá River, the Savannah covers around 300,000 hectares of land with slopes from flat to undulated, including wetlands and alluvial areas, surrounded by steep mountains.

Due to high availability of land on flat to undulated slopes in the plateau, the occupation of the hillsides has been historically slow and restricted. This restriction is also explained by the lack of infrastructure, steep slopes and prohibitive regulations, such as the one which established the Reserva Forestal Protectora de los Cerros Orientales (Protecting Forest Reserve of the Cerros Orientales).

URBAN AREA OF BOGOTA ACCORDIING TO THE YEAR GRAPHIC 03

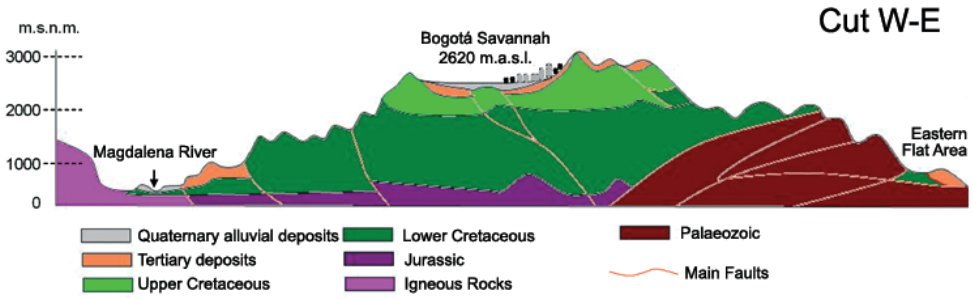


The occupation of the land in Bogotá has been concentrated in gently undulated areas between the base of the Cerros Orientales and the marshy fertile lowlands of the Bogotá River in the west. The construction of important road networks towards the north and west and the urban boom of the 1960s led to a rapid expansion of peri-urban, suburban, and rural strips. Intensive in those directions they encouraged landfills as well as rapid and informal occupation of flat, floodable or non-floodable areas.

Meanwhile, towards the east and south, growth was comparatively restrained and fragmented by mountainous barriers, creating a fractal where the peri-urban, suburban and rural strips are compressed and folded into different areas of occupation, creating a more complex urban-regional border structure.

The city has grown on tertiary deposits at the foothills of the slopes and quaternary alluviums (modern landfills areas). Informal settlements on the hillsides have increased because they have taken advantage of the cuts created by the quarries, of construction material and their roads; or making the cuts themselves. These cuts are usually made on tertiary colluviums, causing losses in confinement and stability.

GRAPHIC 04 LOCATION OF BOGOTA ON THE STRATIGRAPHY OF THE EASTERN MOUNTAIN RANGE



2.1.2. HISTORICAL-CULTURAL FRAMEWORK

History of the occupation

Colombia presents settlements concentrated in the plateaus and inter-Andean valleys. This pattern is caused, amongst other factors, by the distribution of the best climate and the land with the most agricultural potential which had already been identified by an important pre-Columbian settlement in the Andean region. This pattern was imitated by the conquest process and the Spanish foundations during the 16th and 17th Centuries, who settled where the population and production of indigenous societies were.

As a result, almost all the big cities in the country have a typically indigenous location (mainly Chibcha) on gently sloping strips bordered at the lower reaches by alluvial valleys (natural environmental limitation of floods) and at the upper reaches by the mountains that surround the valleys or plateaus (natural limitation of slopes).

With more than 4,000,000 internally-displaced people, the effects of the forced exodus on the growth of cities in Colombia vary according to each city's status in the migration chain. In larger cities, which are often the second or third stop in a displaced person's journey, displaced peoples are a minority amongst the urban poor, but they represent a significant percentage of the inhabitants and builders of the informal hillside settlements.

Unlike Medellin and Cali, where the majority of the poor immigrants come from rural coffee-growing areas, with a tradition of occupation and construction on the mountains, the immigrants in Bogotá come mainly from the plateau or Altiplano Cundiboyacense and lower areas such as the Llanos Orientales and inter-Andean valleys, without any experience or techniques to settle on the hillsides.

On the map, in graphic 05, it is possible to see the general distribution of informal settlements. It shows the concentration of informal settlements in Ciudad Bolívar area in the southern mountains. The Tunjuelo River separates these mountains from the southern end of the Cerros Orientales, where the continuation of the informal hillside settlements in the San Cristóbal and Usme areas can be seen. Although the graphic shows the most recent illegal developments, it must be said that almost 80% of the city was developed with some degree of informality.

In total, the situation of illegal urban settlements to date can be summarised as follows:

- These are distributed over 18 localities. 13 of them located in the periphery present critical rates.
- There are 1,449 illegal developments in the city.
- Equally 190 developments are not legalised; 13% of the total illegal settlements.
- These occupy 7,127 hectares – 20% of the urban area in the city.
- These developments comprise 388,526 properties.
- These have a population of 1,479,898 inhabitants.

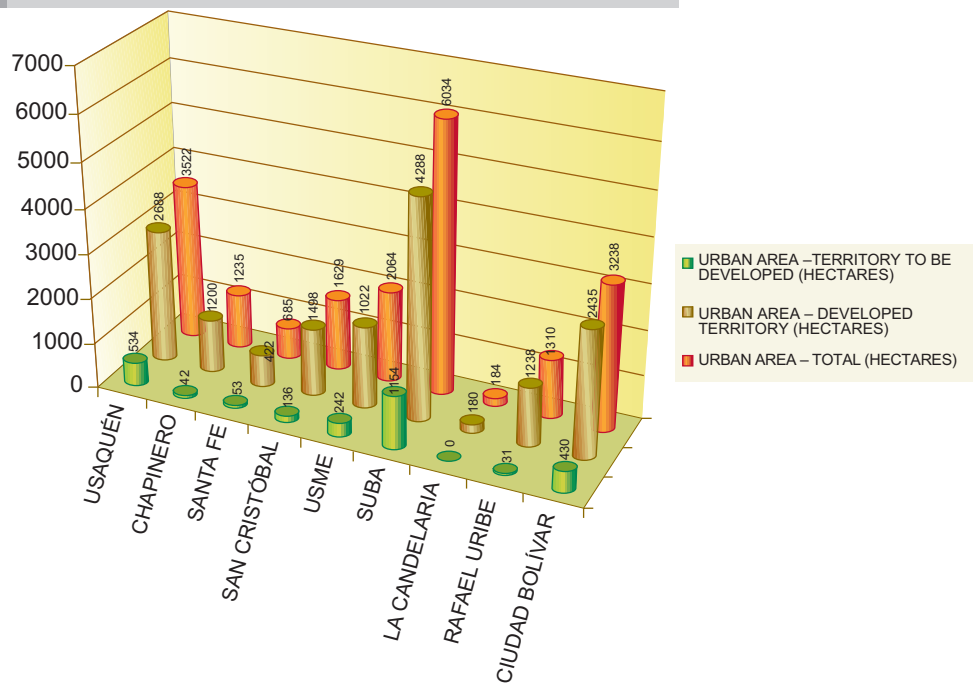
Public perception of the occupation on the hillsides

SETTLEMETS OF ILLEGAL ORIGIN GRAPHIC 05

Source: DPAE.

The perception of the peri-urban mountains shows a clear cultural relativity. While the Cerros Orientales are perceived as the dominant element of the Bogotá scenery, a backdrop that is collectively owned and must be kept green; other hillsides have a more social than environmental meaning, following the socioeconomic segregation in Bogotá: the small hills of Suba are perceived mainly as settlement areas for the higher classes, with their luxury buildings and condos, while the mountains in the south, in Ciudad Bolivar, are perceived as the main poor area of the city.

GRAPHIC 06 URBAN TERRITORY AREA ON THE HILLSIDES



Source: District Planning Secretary

This perception is closely related to the history of the regulations and the ecological conditions of each area. While the Cerros Orientales are green and humid, and their environmental value has been institutionalised by national and regional regulations, the hills in Ciudad Bolivar are arid and eroded, and for them to be recognised as valuable landscape is even more difficult after the alteration by quarries and poor settlements in the last three decades.

The population shows little interest in prevention issues, their interest is restricted to the legislation of the settlements on the hillsides, since this allows them to become part of the city and therefore gives them rights, an instrument used by the public administration to define areas under serious threat and/or risk areas that would have no right to be legalised. Generally speaking, public opinion is adverse to occupation of the Cerros Orientales and in favour of eradicating poverty in Ciudad Bolivar. As a result, the debates on the subject mainly interest social actors directly involved: local politicians, public organisations, grassroots organisations, NGOs that work locally, etc.

2.1.3. POLITICAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

Regulation of town planning and land use

Land use in Bogotá is regulated by the Plan de Ordenamiento Territorial (Land Use Planning), the revisions and amendments to which are laid out in Decree No. 190 in

2004. In this regulation the Cerros Orientales are considered as protection area, the acknowledgment of the national regulation that declares them a national protecting forest reserve. The rest of the peri-urban hillsides do not have this status, except in very small, isolated areas.

Given the scarcity of developable land (flat areas) in Bogotá, the inter-institutional controversy over the occupation of the plateau in the north of the city and the lack of agreement on the regional management of urban growth with neighbouring municipalities, the Land Use Planning declared the valley of the Tunjuelo River, in the south of the city, mostly on the hillsides, an expansion area where more than 500,000 inhabitants would settle in the near future.

Regulation and control of hillside occupation

The Resolution No. 76 in 1977 of the Ministry of Agriculture declares two national forestry reserves in Bogotá: the Cerros Orientales and the Cerros de Suba (called the high basin of the Bogotá River).

The forestry reserve of the Cerros Orientales has experienced great problems with boundary definition (mistakes in the regulations, lack of official cartography), to which a number of contradictory regulations were later added. Today, although there is consensus on the priority of the conservation of the environment and the landscape, there is still great debate with regard to which is the official management plan for the Cerros Orientales. The regulations for protection on the other hillsides include only small areas and have even more problems of delimitation, application and social recognition.

The application of these regulations is controlled by the environmental authority of the city, the Secretaria Distrital de Ambiente (District Environment Secretary) that depends on the Mayor of Bogotá and the regional environmental authority, the Corporación Autónoma Regional de Cudinamarca (CAR – autonomous body). The jurisdiction of both entities encloses the urban perimeter, splitting in two almost all of the mountain surrounding the city, making environmental management and control complicated. Moreover, there is little agreement of criteria between the two authorities.

Administrative autonomy of the city

The Capital District has, as a law, a special administrative regime that confers it great administrative autonomy. However, this autonomy is limited within rural areas considering the meddling of the CAR, the orientation of which changes from one administration to another depending on the good or bad inter-institutional relationship with the Capital District. To this is added the sporadic intervention of the Ministry of Environment, Housing

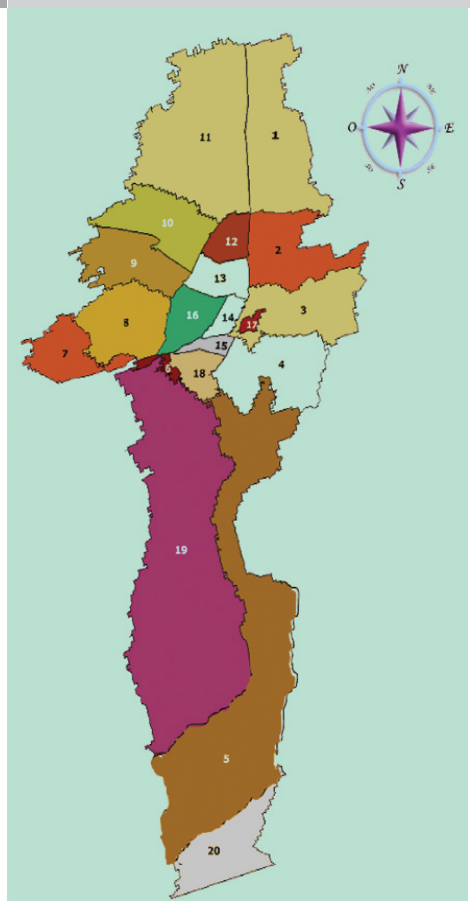
and Territorial Development regarding the Cerros Orientales, since they are a national forestry reserve. Duplication of competences has been for decades a serious limitation for managing the Cerros Orientales hillsides.

With regard to emergency assistance, Bogotá has a Sistema Distrital de Prevención y Atención de Emergencias (District System for Emergency Prevention and Assistance), coordinated by the Dirección de Prevención y Atención de Emergencias (Directorate of Emergency Prevention and Assistance), and regulated through the Decree No 332 from 2004 "which organises the Regime and the System for Emergency Prevention and Attention in Bogotá, Capital District and enacts other dispositions". This Decree follows the general guidelines of the Sistema Nacional de Prevención y Atención de Desastres (National System for Disaster Prevention and Assistance), but has administrative and operative autonomy.

Administrative decentralisation of the city

On the 17th of December, 1954, with the creation of the Distrito Especial de Bogotá (Special District of Bogotá), six neighbouring municipalities joined Bogotá: Engativá, Fontibón, Bosa, Usaquén, Suba and Usme.

GRAPHIC 07 POLITICAL-ADMINISTRATIVE DIVISION OF BOGOTA



The agreement 02 in 1992 divided Bogotá into twenty localities distinguished by numbers:

In flat consolidated areas and areas with urban borders on the hillsides of the Cerros Orientales are: 1) Usaquén, 2) Chapinero, 3) Santa Fe, 4) San Cristóbal, 5) Usme, 17) Candelaria. The Cerros de Suba and the Conejera are isolated minor elevations in the locality of Suba (11).

Usme (5) and Ciudad Bolívar (19) are on the Valley of the River Tunjuelo that divides them, and are mainly mountainous from the south border of the city to its vast rural area that continues with the high elevations of the Sumapaz uplands, in the locality of the same name (20, partially in graphic 07).

The rest of the localities in the graphic correspond to the alluvial borders of the River Bogotá: 7) Bosa, 8) Kennedy, 9) Fontibón, 10) Engativá and part of Suba (11). The locality of Tunjuelito (6) lies on the Tunjuelo River, the main tributary of the Bogotá River.

The other localities are 12) Barrios Unidos, 13) Teusaquillo, 14) Mártires, 15) Antonio Nariño, 16) Puente Aranda and 18) Rafael Uribe that correspond to consolidated urban sectors, including some central parts, with obvious processes of urban disintegration.

Although the regulations have tended, for decades, towards democratisation of local institutions, the strengthening of delegation, dispersal, and decentralisation, in practice these measures have not been supported by strengthening in terms of human, logistics and financial resources, therefore the scope of the local administrations is very limited.

Their capacity in the area of risk management includes the first response to events and the development of local projects on the implementation of district programmes. This is coordinated within the Comités Locales de Emergencia - CLE (Local Emergency Committees) coordinated by each local Mayor. Representatives of the institutions involved in the risk issue and events in each locality also participate. Currently, work is being done on strengthening local strategy and on establishing local plans to make CLE more efficient.

Metropolitan administration

There is a Regional Planning Platform Bogotá-Cundinamarca where the Capital District, the Administration of the Department of Cundinamarca and the Corporacion Autónoma de Cundinamarca also participate. This has made some progress in its institutionalisation but depends greatly on the political willingness of the current government within each entity. Moreover, the participation of neighbouring municipalities is very limited.

In summary, Bogotá does not have a regional planning agreement. There are no coordination agreements or mechanisms for land, environment or risk management on peri-urban hillsides either.

Public property and institutional presence

Considering the 14,000 hectares of the forestry reserve in Cerros Orientales, about 45% corresponds to fiscal property (that is to say, the patrimony of public entities)

as well as to the Police, the Army, and mainly to the Aqueduct of Bogotá (basic services company of joint ownership, but majority-owned by the District) property.

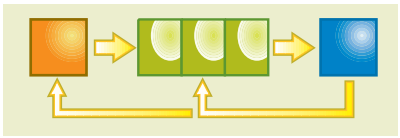
On the other hillsides public or private properties are very few and are limited to areas with infrastructure such as the Doña Juana landfill site, in Ciudad Bolivar, and the tanks and pumping stations of the Aqueduct of Bogotá.

These properties have seen little or no adaptation for public use; therefore they have not been occupied or used by the community. The hills are still the patrimony of the community but inaccessible even in fiscal areas.

For the rest, there is little institutional presence on the hillsides; it is limited to sporadic and discontinuous police intervention or to relocation or mitigation programmes, both of corrective character in relation to formal occupation.

2.2. THE NUCLEOUS OF THE SCENARIO

2.2.1. CHARACTERISATION OF THE HILLSIDE AREAS



Developable land is in short supply, leading to restricted access to Vivienda de Interés Social-VIS (Social Housing). The reduction of available developable land has resulted on its overvaluation, restricting demand. This becomes another factor for increasing the formation of human settlements on hillside areas, where promoters of illegal urbanisations sell pieces of land at very low prices.

On the other hand, the housing policy on acquisition of Social Housing (VIS) has very stiff requirements. It is necessary to earn, legally and currently, up to four times the minimum wage (SMMLV). When compared to the average household income, the chances of accessing this type of housing are very low. For this reason the illegal occupation of land becomes an alternative for the strata[5] 0, 1, and 2, in search of "secure housing".

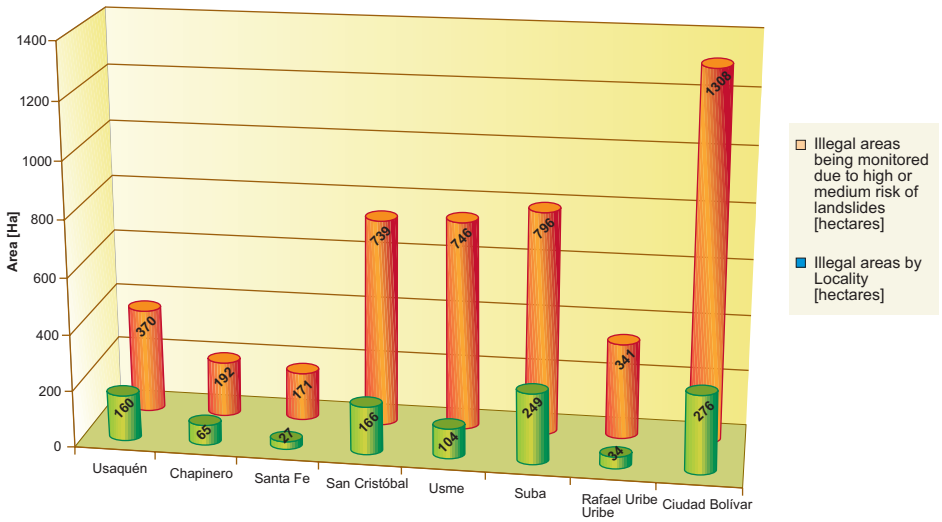
In consequence, the percentage of the city area illegally developed is around 23.6 %, with approximately 1,500,000 inhabitants. Calculating the total area, 3,400 (49.2%) of the 6,906 illegal hectares in the city are located over hillsides. (See Graphic 02).

5. The Secretary of District Planning divides Bogotá into six socio-economic strata; in which 0 is the lowest income level'] and 6 is the highest level.

The development of these settlements is progressive, because they start with lack of facilities, services and infrastructure, which is solved partially and slowly as long as the networks expand, resources are built and roads improved. These settlements are mainly formed by houses that can also be built progressively (the form, the material, and the size change, as its owner can afford to improve it).

In the Mapa Único de Prevención de Desarrollos Ilegales[6] (Map of Illegal Developments Prevention) 148 areas are found in the city that require immediate monitoring and control, making a total of 1,107 hectares with a high or medium risk of landslides. (See Graphic 08).

RELATION OF AREAS WITH A HIGH OR MEDIUM RISK OF LANDSLIDES — GRAPHIC 08



Source: DAMA

On the other hand, according to the information supplied by the Secretaría Distrital de Ambiente (Environmental Secretary), the environmental authority in the urban perimeter, the Capital District has an affected area of 204 hectares, 0.5% of the urban perimeter area, due to exploitation of quarries.

All of this has originated different modalities of informal settlement development, which are gradually being consolidated. For instance, the surroundings of active and inactive exploitations and brick makers (areas where clay materials were exploited for the construction of bricks, pipes, amongst others) that in most cases are generated by the workers of the quarries themselves, who in need of housing carry out the first occupations. This corresponds to illegal urbanisation with a tendency to the periphery, associated with the migration of the population to the city and

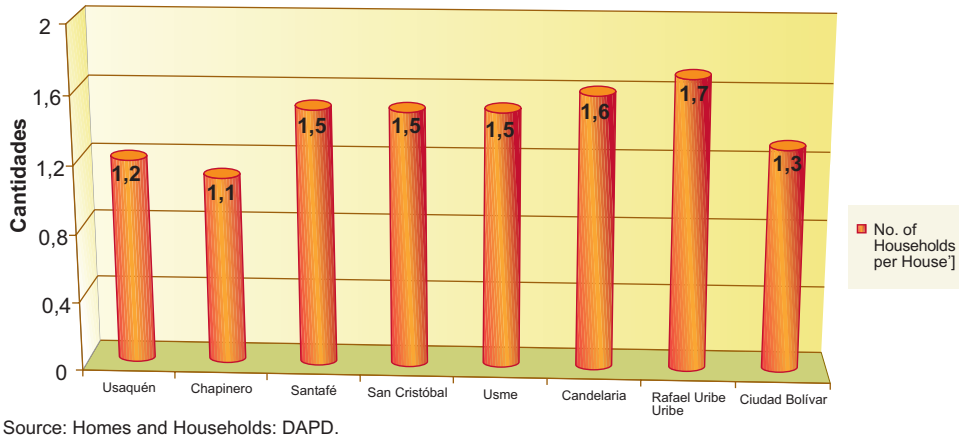
6. Subsecretaría de Control de Vivienda. Boletín Consolidado del Mercado de Vivienda. 2005.

within the city. However, these exploitations are an important source of unskilled employment and income.

Bogotá's most intense occupation processes lie along a north-south expansion axis. The settling of hillside areas of Bogotá was a gradual process developed in different stages. The first took place in the 1950s and 1960s as a result of migration from rural areas in Cundinamarca, Boyacá, Tolima and 'Huila of people displaced by political violence. This situation converged with the division and sale of lands to illegal developers, who subdivided and sold them in plots with no access to public services.

The second stage started towards 1970, bringing relatives, neighbours and people from the same villages of the first settlers, as well as people from Bogotá from neighbourhoods such as Girardot, Las Cruces and San Cristobal. Towards the end of the 1970s the third settlement stage began, with the arrival of tenants. This new means of survival led many inhabitants to modify the space in their homes dedicated to rural work, and build more rooms for renting. This meant that there were on average 1.4% households per house, but only 71.68% owned a house. (See Graphic 09).

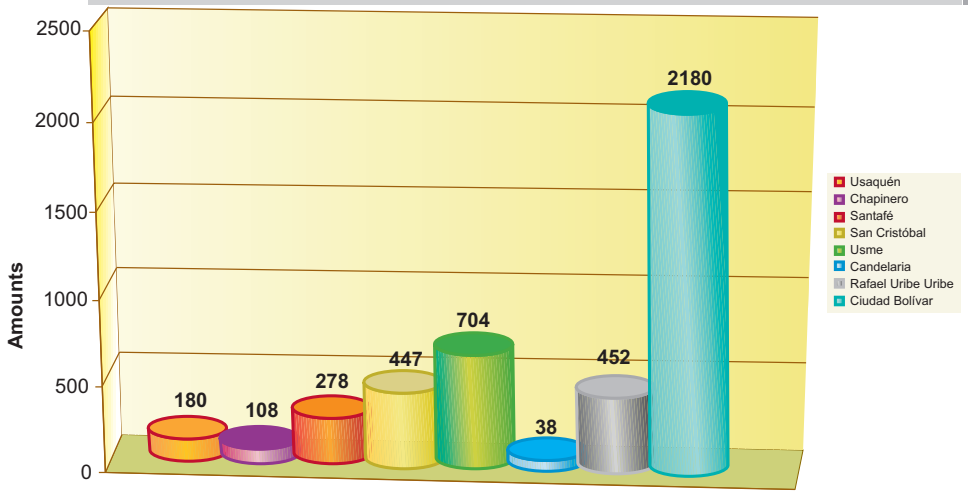
GRAPHIC 09 **HOUSING DEFICIT ON THE HILLSIDES**



Source: Homes and Households: DAPD.
Calculations: Proyecto Bogotá Como Vamos.

The population that develops and inhabits these settlements mainly comes from the natural increase of the poorest social groups within the own city, and of migration coming from other areas in the country. These are usually rural populations who migrate to escape poverty or are displaced by different forms of social conflict. This process is particularly concentrated in the locality of Ciudad Bolivar. (See Graphic 10).

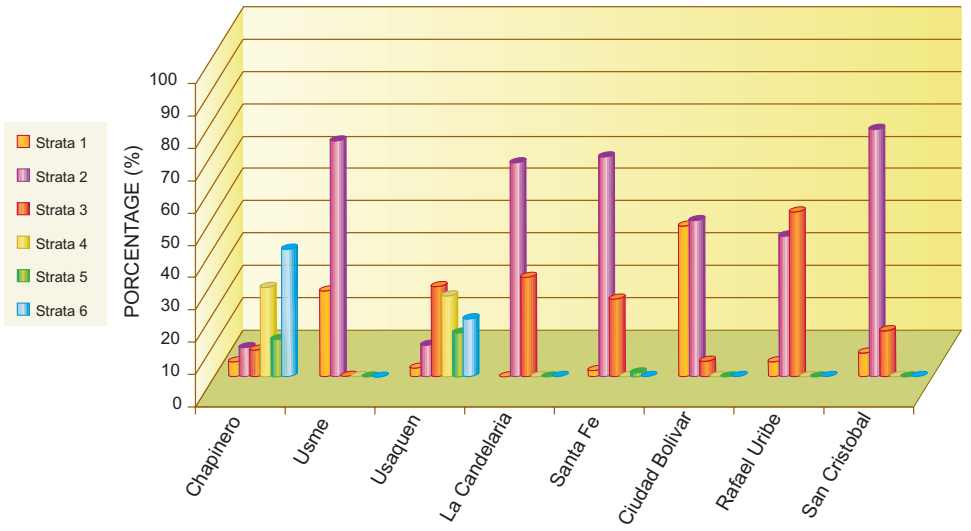
DISPLACED POPULATION ON THE HILSIDE AREAS GRAPHIC 10



The social dynamic of the settlements is marked by poverty, marginality and informality. According to the numbers presented by the SISBEN, 19.1% of the localities on hillsides and the rural scenarios are included in level I; and 22.3% corresponds to level II.

In Bogotá an average of 32 houses per hectare are registered. The locality of Usme presents the lowest housing density, with 25 houses per hectare. With regard to population density, on average there are 192 inhabitants per hectare. The locality of Chapino presents the lowest rate, with 103 inhabitants per hectare. In the contrary, San Cristobal presented the highest rate, with 307 inhabitants per hectare. (See Graphic 11).

SOCIAL STRATIFICATION ON THE HILLSIDE AREAS OF BOGOTA GRAPHIC 11



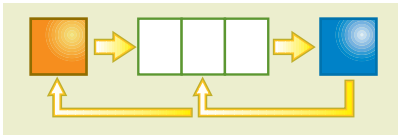
Source DAPD

CHART 01 ACTORS OF RISK CONSTRUCTION AND MANAGEMENT

ACTORS		RELATION WITH RISK GENERATION OR REDUCTION
Community	Weakly organized communities Grassroot organizations (Juntas de Acción Vecinal)	■ Organized for occupying low-cost but hazard prone hillsides areas. ■ Organized for putting pressure on local authorities for getting public services and infrastructure, consolidating the neighbourhood.
Government	Public service companies	■ Expand the service networks according to the land use normative and the District Planning and the DPAE concepts. ■ Nevertheless, some networks are expanded or legalized in informal zones. This contributes to the consolidation of these neighbourhoods
	Water and Sewage Company	■ As a municipal company, this expands the water network according to the land use, environmental and risk management normative. ■ This company has an additional responsibility: the bordering of environmental management zones and conservation of water courses. ■ The company is also the owner of approximately the 40% of the Cerros Orientales.
	Secretaría Distrital del Hábitat. (Habitat Secretary)	■ Formulates the policies for urban and rural land management in order to increase the productivity of urban land and to guarantee comprehensive development of the settlements. ■ Coordinates the Inter-institutional network of Prevention and Control of Illegal Developments, where many institutions from the district participate.
	Secretaría Distrital de Ambiente. (Environmental Secretary)	■ Environmental Authority inside the urban perimeter. ■ Coordinates the Environmental System of the District. ■ Manages the District System of protected areas.
	Corporación Autónoma Regional de Cundinamarca.	■ Regional environmental authority. ■ Autonomous organisation whose jurisdiction includes the rural area of the Capital District.
	Dirección de Prevención y Atención de Emergencias (DPAE) -Secretaría de Gobierno. (Directorate of Emergency Attention and Prevention)	■ Coordinates District System of Emergency Prevention and Attention. ■ It has a specialised management group for the peri-urban hillside scenarios. ■ It has political, coordination and management functions. No police role is considered. ■ Its concepts have a direct effect on the delimitation of non-developable land due to risk. ■ Identifies high-risk areas and the families to be included in the relocation programme due to high non-mitigable risk. ■ Defines areas of mitigating risk. ■ Coordinates risk mitigation work.
	Caja de la Vivienda Popular. (Social Housing Office)	■ Coordinates and carries out the relocation programme for high non-mitigable risk. ■ Manages the Programme of comprehensive improvement of neighbourhoods, where many entities participate. ■ Carries out the programme of housing improvement and titling.

ACTORS		RELATION WITH RISK GENERATION OR REDUCTION
	Secretaría Distrital de Planeación. (Planning Secretary)	■ Administers Land Use Planning. ■ Formulates policies and instruments that control the use of the territory and the development of infrastructure and equipment. ■ Accelerates legalisation processes of informal developments and their inclusion into the urban perimeter. ■ Supervises the Urban Planning Offices. ■ Coordinates post-event recovery plans the DPAE.
	Curadurías urbanas. (Urban Planning Office)	■ Private offices appointed by the Capital District to deal with the paper work and approval of town-planning and construction licenses.
	Instituto de Desarrollo Urbano. (Institute for Urban Development)	■ Plans, undertakes and maintains the road network. ■ It is in charge of mitigation work related to the network. ■ Accelerates relocation processes with public works.
	Secretaría Distrital de Integración Social. (Secretary for Social Integration)	■ It is in charge of managing welfare, equity and social inclusion, placing emphasis on marginalised groups and areas. ■ Participates in the social management process that accompanies the interventions in informal settlements on the hillsides and coordinates social assistance for the affected population during emergency situations.
	Other entities.	■ Other entities are in charge of the construction of facilities for the community in legalised settlements. ■ However, some of these constructions have localisation problems or require structural reinforcement.
Private	Land Owners	■ Faced with the prohibition to develop the hillsides and/or the pressure of criminal groups they transfer their plots to the informal market managed by "Loteadores" (land dealers).
NGO		■ Provide assistance in many different ways, particularly in areas such as income generation, protection of vulnerable groups and strengthening of self-management.
Local political representa-tives	Town Councillor or Council Members.	■ Some are part of the informal chain of mechanisms that leads to the legalisation and consolidation of the settlement.

2.3. UNSAFE CONDITIONS



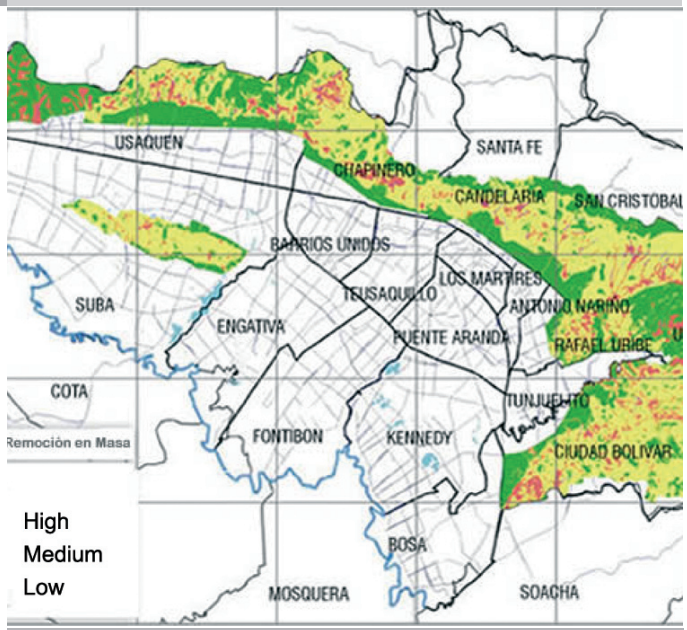
The main events of unsafe conditions in informal settlements on the hillsides of Bogotá are landslides (including falls, subsidence, rockslides, overturns) and flash floods in the ravines.

The majority of landslides happen slowly and in a localized way, usually with crack on the land and on the buildings. This causes a rapid response to make a diagnosis of the areas and the buildings, followed by temporary evacuations, mitigation work or permanent relocation, depending on the case. This way, there are unlikely to be any injuries or fatalities during these events.

However, eventually, and usually coinciding with winter and land saturation, more violent events occur, in which landslides are usually associated with flash floods. In these cases injuries and sometimes fatalities are common.

The map in graphic 12 shows the hazard by landslides zoning on the hillsides of Bogotá, in relation to the division by localities.

GRAPHIC 12 MAP OF HAZARDS BY LANDSLIDES



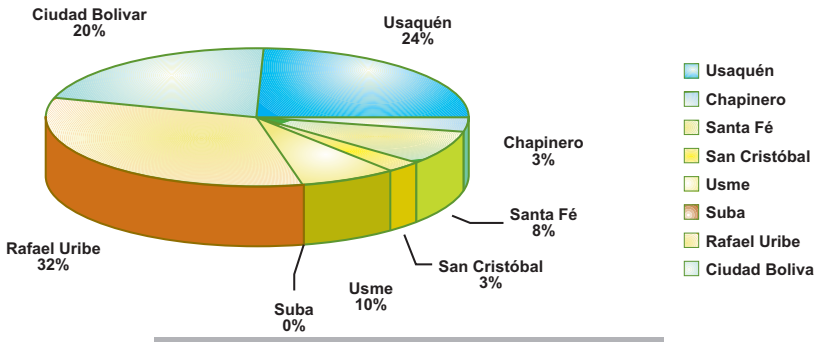
Source: DPAE

Landslides are the most recurrent event in Bogotá, and they occur mainly in the localities of Usaquén, Chapinero, Santa Fe, San Cristóbal, Usme, Suba and Ciudad Bolívar. Landslides can be triggered as a side effect of earthquakes and floods. The following graphic 13 shows the graphic representation of landslides registered in the period from 1996 to 2001.

In the city 450 sectors with landslides and around 200 potentially unstable escarpments (rough steep slopes) from old quarries which are currently occupied

by human settlements have been identified. The studies that have been carried out include an historical registry of emergencies; amongst these are, with particular importance on the hillsides, floods, earthquakes, avalanches and collapses. On average there are around 500 emergencies caused by landslides a year.

DISTRIBUTION OF EVENTS BY LANDSLIDES BY LOCALITY GRAPHIC 13



Source: DPAE

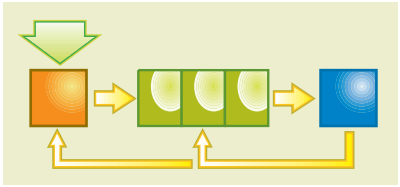
The study of 175 high-risk areas, where active landslides are registered, and the technical recognition of the places where emergencies occur, has allowed defining the areas of "high non-mitigable risk". Within these areas it is not possible, technically and economically speaking, to reduce risk; and therefore it is necessary, amongst other aspects, to relocate the families. To this date, 8,245 high non-mitigable risk properties have been identified, most of them located on approximately 170 hectares that have been defined as protected land due to risk conditions.

3. INVENTORY AND DESCRIPTION OF PRACTICES AND INSTRUMENTS FOR RISK MANGEMENT

Based on the Pressure-State-Response Model of risk dynamics in the scenario, the following main risk management instruments are presented, grouped according to their action on dealing with the environment, the nucleus of the scenario, unsafe conditions, or the effects.

3.1. MANAGING THE ENVIRONMENT

The management of the scenario tries to have an effect on key actors to modify policies, regulations, and public organisations that affect risk generation; or of cultural, social, political and economic factors that directly condition the functioning of the nucleus of the scenario.



3.1.1. POLITICAL-REGULATORY FRAMEWORK

Risk management policy in Bogotá is recorded in three district regulations: the Agreement No. 011 in 1987 that creates the Fund for Emergency Prevention and Assistance (FOPAE); the Decree No. 332 in 2004 that reorganises the District

System for Emergency Prevention and Attention; and the Decree No. 423 in 2006 that adopts the District Plan of Emergency Prevention and Assistance.

These regulations developments strongly place and clearly organise the issue of comprehensive risk management in the district territory. These are compatible with the national process framework that after the avalanche of Armero in 1988 led to the organisation of the National System for Disaster Prevention and Assistance, through National Decree No. 919' in 1989. This norm placed the issue in the Colombian Institutional System and created the obligation to form regional and municipal systems similar to the national system.

This district political-regulatory framework has the following main strengths:

- Creates financial support for risk management.
- Creates specific responsibilities and investment obligations for risk management in different organisations of the district.
- Establishes a coordination system that links all district institutions in the area of risk management.
- Establishes clear management, risk analysis and contingence plans for the individuals that are identified as generators of public risk.
- Adopts an approach of risk management, not by instruments (prevention, mitigation, attention, etc) or by hazard (earthquakes, floods, technological, etc), but rather by scenarios: hillsides, alluvial areas, consolidated city, industry, networks, etc. This way, at the centre of the management is the clear identification and connection between public, private and community actors, responsible for concrete scenarios, which are the framework of territorial, social, and economic risk generating processes.

With regard to informal settlements on the hillsides, this framework has the strength to generate a specific management scenario for peri-urban hillsides; a specialised group from the DPAE is dedicated to organising the different entities involved with the territorial strip, and for which specific management instruments are developed.

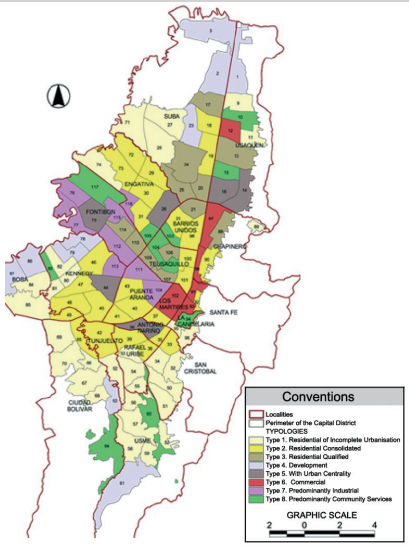
3.1.2. TERRITORIAL PLANNING FRAMEWORK

Risk is a key factor in urban and territorial planning in Bogotá. The Land Use Planning (POT) was elaborated from the definition of the protection land, which includes areas with higher environmental conservation value and high hazardous areas. Through these regulations, whenever progress is made in identifying and defining high-risk areas, regulatory restrictions on urban development are immediately put into place.

The Land Use Planning is developed through subsidiary instruments such as Master Plans for Facilities and Zone Planning Units. The former define the guidelines for the development of networks, facilities and general systems in the city, including in their analyses criteria of vulnerability reduction as well as the hazards generated by specific operations.

The Zone Planning Units are the result of participative exercises where urban actors with certain homogeneity regarding economic form and functions, together with the entities led by the Secretaria de Planeacion Distrital (District Planning Secretariat), define detailed regulations of occupation and use, within the framework of the District Land Use Planning. In these exercises the starting criteria include those of safety in localisation and mixture of activities and infrastructure.

GRAPHIC 14 TYPOLOGY OF ZONE PLANNING UNITS (UPZ)



Source: Secretaría de Planeación Distrital

Moreover, work is currently being' carried out on the elaboration and agreement of a district policy for the comprehensive management of protected land, which is the only one that by law is restricted from the possibility of urbanisation. It is delimited in Bogotá by its POT and includes landscape and environmental conservation areas, high hazard areas and land reserved for the construction of domiciliary public services.

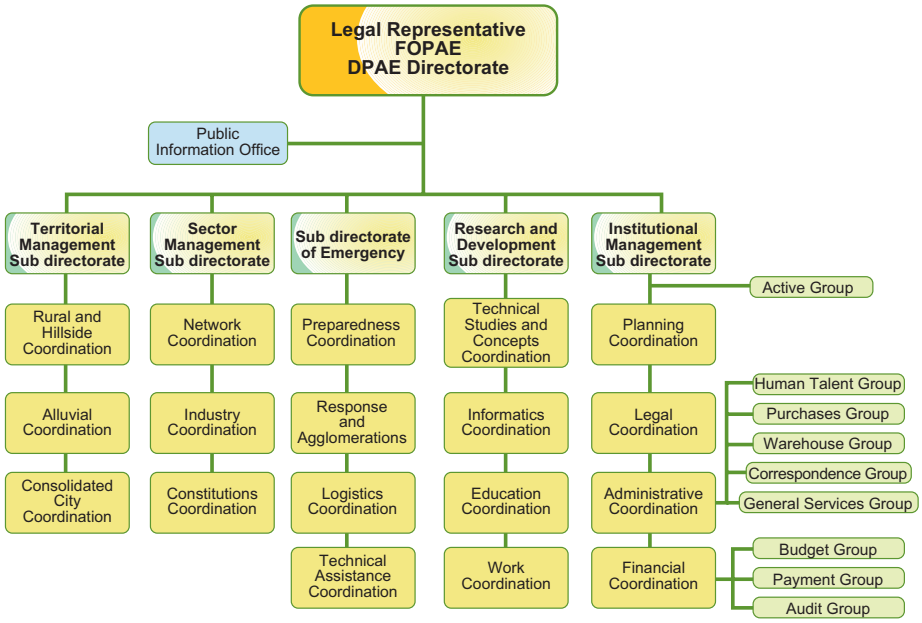
3.1.3. INSTITUTIONAL FRAMEWORK

The Directorate of Emergency Prevention and Attention (DPAE) is the governmental office attached to the Secretaria de Gobierno (Government Secretariat) of the Main City Hall in Bogotá that defines policies and integrates actions for risk prevention and disaster attention of the different entities that are part of the District System of Emergency Prevention and Attention (SDPAE).

Within this context, Bogotá organises and establishes regulations on the subject. As a result, the city has currently formed the Fund for Emergency Prevention and Attention (FOPAE) as a source of resources that receives 0.5% of the tax income in the district, the DPAE as a coordinating entity, and, the SDPAE that joins together and connects different public, private and community actors.

Graphic 15 summarises the current organisation of the DPAE.

ORGANISATION OF THE DIRECTON OF EMERGENCY PREVENTION AND ASSITANCE GRAPHIC 15



Source: DPAE

The SDPAE, incorporated within the national system of the same nature, was created and organised by Extraordinary Decree No. 919 in 1989. This system is the ensemble of coordinated processes that, within the scope of their capacities, with their own resources and according to the regulations, functional relationships and applicable regulations, public and private entities bring forward in an autonomous and coordinated manner. This for implementing plans, programmes, projects and specific actions with the aim of ensuring the comprehensive management of existing risks in Bogotá (Decree No. 332 in 2004).

3.1.4. POLITICAL ENVIRONMENT

The preparation of thematic documents is already a common practice in the Capital District. These documents are presented to the different campaigns of political groups, before the Municipal and the District Council elections. With this it is intended to ensure incorporation and improvement of the way key issues, such as risk management, are tackled in government programmes proposed by the different candidates. It has been proved that this increases the sensibility and receptivity of the eventual elected candidates and that has contributed to encouraging administrative and legislative measures in favour of risk management development in Bogotá.

3.1.5. CULTURAL ENVIRONMENT

Cultural management is still weak, in the sense that even if frequent mass campaigns on risks are carried out, there are still a lack of measures to promote the conservation of the mountains near the city and the prevention of informal settlements.

Recently the campaigns against informal occupation have been more frequent. The debate about the conservation of the Cerros Orientales, its repercussion in mass media and the hardening of the control on private individuals and entities has resulted in greater awareness of the population on the protected nature of these areas and on the scope of all the related regulations.

INSTRUMENT 1 INSTITUTIONAL FRAMEWORK OF RISK MANAGEMENT IN BOGOTA: DPAE AND SDPAE

Objective: Define policies and coordinate the action of the different district entities in comprehensive risk management.	**Institution or organisation that implements it:** The DPAE is the entity in charge of defining the policies, organising and coordinating the SDPAE and carrying out part of the risk management.
Implementation	**When:** Since 2004 when the SDPAE was created.
	Where: Covers the whole District of Bogota.
	With Whom: The SDPAE that covers all the entities in the district related to land development and emergency assistance, which is the majority of the institutional apparatus in the Capital District.

Background:
In 1969 the District Council created the Comité'e9 Asesor de Urgencias (Emergency Advisory Committee) and the Fondo Especial de Emergencias (Emergency Special Fund) was set up. In 1979 a special emergency fund was set up and a temporary tax was imposed to help those affected by the floods in the Distrito Especial de Bogotá'e1, also a Junta Pro-Damnificados (Board in Favour of the Victims) was created. In 1987 the FOPAE was created. The National Decree No. 919 in 1989 created the National System and obliged the creation of the regional and municipal systems. The Decree No. 332 in 2004 created the SDPAE.

Results:
An inter-institutional risk management system, coordinated by the DPAE, was created within the city. This system follows one policy, responds to one plan and has the intervention and resources from each entity.
The entities attached to the system include prevention and preparation criteria in their projects.

Activities:
- Regulatory development of the system.
- Production of policies and manuals.
- Regular meetings of the District Committee and the thematic commissions.
- Coordination of the projects specific to each entity.

Approximate budget:
- Meetings: US$10,000/year
- Policy and manual production: US$100,000/year

Potential:
A system that has achieved placing risk management on a thematic level can have greater influence in a wide range of areas, encouraging its inclusion in other sector and thematic policies: environment, housing, transport, competitiveness, social welfare, etc.

Limitations:
The relation between entities in the system, and between these entities and the DPAE still depend on networks of personal contacts with little institutionalisation of communication and cooperation procedures.

Proposals for improvement:
- Strengthen the system at local level, where the delegates from the different entities need more representation and power to make decisions, and the local authorities have more power.
- Strengthen information exchange mechanisms and procedures of joint communication, cooperation and verification.

INSTRUMENT 2 LAND USE PLANNING (POT) AND DERIVED INSTRUMENTS: MASTER PLANS AND ZONE PLANNING UNITS

Objective: To guide the coordinated development of the territory, the localisation of the population and the activities.	**Institution or organisation that implements it:** Secretarí'eda de Planeació'f3n Distrital (District Planning Secretariat)
Implementation	**When:** The first version of the current POT was developed in 2000, through Decree No. 619. The subsequent modifications have been compiled in Decree No. 190 in 2004.
	Where: The POT covers the whole territory of the district and regulates its occupation, use and transformation by any private or public agent.
	With Whom: Formulation and implementation by the Secretarí'eda de Planeació'f3n Distrital (District Planning Secretariat).

Background:
The first Physical Land Use Plan was the Agreement 6 from 1990 which consolidated the big improvements of urban planning in Bogotá'e1 at the time. Risk considerations and environmental protection were considered amongst the key determinants of occupation and use.

Results:
The POT is considered the main management instrument for social development and institutional work in the Capital District. It has even encouraged formal town planning and taken spaces away from informality.
Today each area and each urban structure is regulated by the POT and the investments made by the different entities are adjusted to its guidelines, which ensure respect for the restrictions by risk that are the basis of the plan.

Activities:

- Thematic studies.
- Studies of borders.
- Coordinated formulation with all the entities in the district.
- Coordination with the Consejo de Planeacion Territorial (Land Planning Council) where the professions, the NGOs and communities are represented.
- Coordination with environmental authorities.
- Paperwork before the District Council.
- Adoption through Decree by the Mayor.
- Development of the statutory instruments through sector and local participatory planning exercises.
- Regular review of entities' investment programmes to meet the goals and scenarios of the POT.
- Surveillance and control of land use.

Approximate budget:
Ex.

- Studies: US$ 1,200,000
- Formulation: US$ 800,000
- Formulation of a master plan: US$ 80,000 – 160,000
- Formulation of a UPZ: US$ 40,000

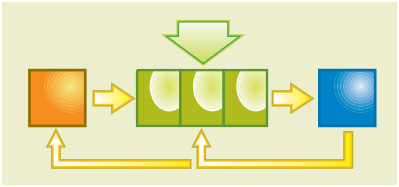
Potential:
The POT controls the territorial development all within the Capital District. However, some of its most interesting aspects, such as the added value and other land management instruments have taken some time to be implemented, in part due to the novelty of these mechanisms in Colombia.

Limitations:
The POT of Bogotá'e1 presents two serious limitations. Firstly, there is the lack of conceptual and methodological development of borders phenomena: peri-urban, suburban structures and dynamics and the different rural forms. Secondly, there is a lack of agreement on a metropolitan (Sabana de Bogotá'e1) and regional Cundinamarca model; for this reason the city is still enclosed in its own planning without a way out for many problems that can only be tackled regionally, such as the housing and developable land deficit.

Proposals for improvement:
The main challenge for the improvement of the planning outline of Bogotá'e1 is to better develop two closely-related issues: borders and metropolisation. The suburban has been underestimated and the peri-urban is just starting to be appreciated, when these are the main territorial elements that constitute metropolisation.

3.2. MANAGING THE NUCLEUS OF THE SCENARIO

This section intends to identify the instruments and practices that aim at modifying the characteristics of the actors, the processes and the areas in informal settlements on the hillsides, in order to prevent or reduce risk generation.



3.2.1. RISK VALUATION

Bogotá has not only made significant progress in the area of risk valuation, it also has a fundamental effect on the whole planning and management of urban and territorial development, which is even more important.

Amongst the progress made it is worth highlighting:

1. The setting-up of a multidisciplinary and specialised team of high technical level in the DPAE.
2. Studies and cartography at different scales about the main hazards found in the district territory.
3. The Sistema de Información para la Gestión de Riesgos y Atención de Emergencias de Bogotá (SIRE); (Information System for Risk Management and Emergency Assistance).
4. A strong methodological development in risk valuation.
5. The inclusion of the risk component in land planning and into the different instruments of land management.
6. Risk evaluation and identification through technical diagnoses and the technical definition of high mitigable and non-mitigable risk zones.
7. Preventive monitoring to prevent illegal occupation of the land through the Red Interinstitucional de Prevencion y Control de Desarrollos Ilegales (Inter-institutional Network for the Prevention and Control of Illegal Settlements).
8. Systems to monitor the phenomena from permanent networks of accelerographs and gauges, linked to regional and national hydro meteorological networks, as well as community monitoring networks.
9. Active flux of information.
10. Continuous campaigns and informational material for the socialisation of information about risk.
11. Adequate incorporation of the information in the decisions and projects of entities and formal entrepreneurs.

3.2.2. PROSPECTIVE MANAGEMENT

The prospective management of any issue in the Capital District, risk included, is based on the POT, developed by Bogotá, as for each municipality, within the

framework of the Law No. 388 from 1997. This law proposes a systemic view of territorial development and confers vital importance to the determinants of environmental planning, and to the zoning of hazards and risks.

The POT of Bogotá stands out because of the way it is based on the delimitation of the protected land, which restricts the possibility of urbanising by including three components:

- Areas of landscape and environmental conservation.
- High hazard areas (prevention of settlement); or high non-mitigable risk (relocation).
- Land reserves for infrastructure of domiciliary public services (sanitary landfill, water treatment plants, etc).

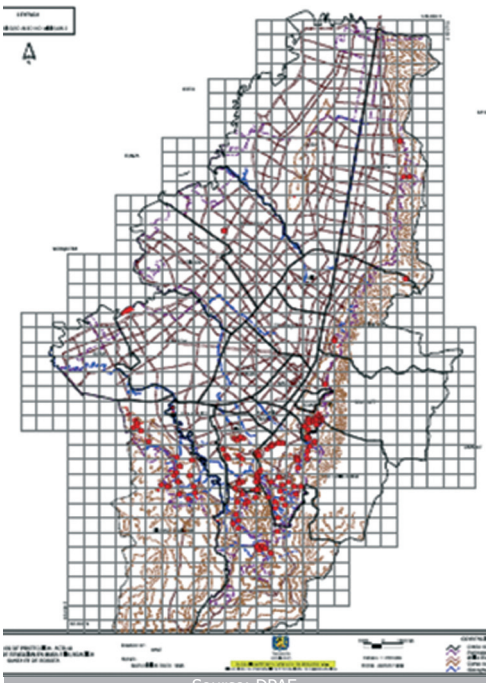
One of the most important aspects of the way in which planning in Bogotá includes the risk factor is that this mapping does not stay on paper, but rather unfailingly has a concrete effect on the physical development of the city. This is due to many factors, including:

- The zoning starts from hazards and not from risks, which meant that Bogotá went from a vision of risk as a fulfilled fact, to one of risk as social construction. In other words: hazards are there and that is what planning collects and shows; from this basis risk can be generated or prevented.

- The regulation of occupation and use starts from the restriction of protection areas, and zoning hazards is one of its determinants.

- High hazard areas that have been declared protection areas, due to risk, are not isolated from development; instead they are given a treatment that will incorporate them to town planning as part of green urban spaces or the hydraulic structures of the city.

MAP OF PROTECTION AREAS DUE TO RISK GRAPHIC 16



Source: DPAE

It is not recommended to incorporate all areas that have been defined as hazard areas, as if they were protection areas; there are cases where for some high hazard areas it is a condition to carry out studies and mitigation work within the framework of the Resolution No. 227 from 2006.

- The POT is developed through a series of subsidiary instruments, and each one of them starts from zoning hazards, taking into account criteria of risk prevention. Amongst these instruments four are worth highlighting:

  - Plans of different areas that give detailed guidelines for certain areas, such as the limits of the hillsides.

  - Partial plans, which apply to expansion land, urban areas with development treatment in areas of 10 hectares or more and in urban areas with refurbishment treatment (in the modality of redevelopment) to guarantee comprehensive town planning in areas suitable for this purpose, instead of specific constructions.

  - The Zone Planning Units (UPZ) that divide the city into morphologically and functionally differentiated sectors; for each sector detailed regulations of use and construction are defined.

  - Master plans for networks and equipment that define short-, medium- and long-term development for all the infrastructure of the district, urban, and rural territory, from road design and domiciliary services network to public space and localisation and typology of health, education and safety resources.

- Land Use Planning and the Regulations contained in the POT "have teeth", that is, they effectively condition the development of public and private projects. The projects of public entities, since their design includes all the regulations found in the POT and its derivate instruments, and also the District Planning Secretariat, in charge of the formulation and administration of the POT, is the same entity that approves the budgets of the different entities each year and afterwards all town-planning projects (networks, equipment, etc). Private projects process their license in the same Secretariat, if they are on a large scale, or before the Urban Planning Offices (delegated by the Secretariat) which process them according to the regulations in the POT.

- The legalisation process, although not a planning instrument, is a procedure considered in the POT, through which the administration of the district, recognises, approves plans, regularises and issues the regulation for illegal human settlements. The risk factor has been incorporated in this process since 1997 through the Technical Concepts issued by the DPAE.

- Although the zoning of hazards is one of the basic elements of the POT, due to changes in the physical condition of the land it can be updated and detailed at any time. As such, under the authority of the DPAE, the identification or delimitation of a certain zone changes. This automatically affects the design of public projects and the licences for private actors.

- Another important instrument is the Mapa de Zonas de Tratamiento Especial para la Mitigación de Riesgo por Remoción en Masa (Map of Areas with Special Treatment for Risk Mitigation due to Landslides), Plan No. 5 of the POT. Thanks to this instrument the priority areas to carry out risk studies and mitigation work are identified.

GRAPHIC 17 MAP OF RISK AREAS WITH SPECIAL TREATMENT

Source: DPAE

INSTRUMENT 3 SISTEMA DE INFORMACIÓN PARA LA GESTIÓN DEL RIESGO Y ATENCIÓN DE EMERGENCIAS (SIRE).

Objective:	**Institution or organisation that implements it:**
Facilitate risk management and emergency assistance in the Capital District through functions and management processes that allow capturing, integrating, producing, and disseminating technical and coordination information relevant for the entities that are part of the SDPAE and for the community.	DPAE

Implementation	The SIRE was created through the Agreement 006 in 1998, signed between FOPAE and INGEOMINAS, but it has been destined for the use of the SDPAE in risk management. Therefore the common users of the SIRE are all those organisations and individuals that have responsibilities in the area of risk management in Bogotá'e1.

Background:
Initially the system was developed based on the experience of INGEOMINAS.

Results:
The system keeps updated, geo-referenced and elaborated information about hazards, studies, visits, concepts and all kind of interventions, allowing monitoring and joint vision of risk management in Bogotá'e1. It has become the platform via which the institutional memory of risk management and emergency assistance is protected in Bogotá'e1; at the same time it constitutes a free source of consultation for both planners and professionals related to risk management, and the community in general.

Activities:
- Development of the architecture of the system.
- Development of specific applications.
- Acquisition and loading of information.
- Development of agreements and protocols for the exchange of information.
- Standardisation of methods and formats within the Comisió'f3n Distrital de Sistemas (District Commission of Systems).
- Continuous technological improvement.

Approximate budget:
- Technical training of two people from the Informatics Unit of the DPAE: US$1,000
- Software purchase – "ARCIRWISIS": US$2,500
- Technical assistance: US$1,000
- Web page design: US$800
- Maintenance of the system: US$10,000 per year
- Maintenance of the web page: US$1,000 per year

TOTAL: US$16,300

Potential:
The system has much more useful information that the one that is currently used in management. Much more use could be made of the system in coordination between units within the DPAE and between entities of the SPDAE. Risk management can achieve a much higher efficiency through the systematisation of operations of information by the SIRE.

Limitations:
- Cost of acquisition of certain types of information, a recurrent expense due to the need to keep it up to date.
- Greater training and promotion are needed to optimise its use between technicians from the DPAE and SDPAE.

Proposals for improvement:
- Agreements with entities that generate information and between entities in the district that use the information, so it is possible to reduce acquisition costs.
- Adjustment of the architecture and visualisation of the system towards a more user-oriented vision and towards the daily management processes.

INSTRUMENT 4 DISTRICT PLAN FOR EMERGENCY PREVENTION AND ASSISTANCE [PDPAE]. COMPREHENSIVE RISK MANAGEMENT METHODOLOGY BY PARTIAL SCENARIO

Objective:

Organise risk management in the Capital District within a conceptual, methodological and operative outline that balances existing and future progress made in emergency assistance and corrective measures, with the necessary development of prospective management, through the construction of social processes that would modify risk-generating causes and dynamics.

Institution or organisation that implements it:

The DPAE, as the entity that formulates and coordinates the plan with other entities of the SDPAE.

Implementation:

The PDPAE started its implementation within the DPAE with its restructuring in 2006, and the development of the agendas of the entity by scenario. In 2007 work began on coordination of the comprehensive management agendas with the local communities, the private sector and other entities in each one of the four scenarios of the territory: rural and natural areas; hillside urban borders; urban networks, and built-up areas.

Background:

The planning and management methodology by partial scenario had been primary developed for the formulation of the Environmental Management Plan of Bogotá'e1 and the Regional Environmental management Plan of Cundinamarca. The DPAE identified the potential of the method to achieve totally comprehensive risk management, and adopted it for the formulation of the PDPAE and the respective restructuring of the entity.

Results:

- The plan was formulated inside the technical teams of the DPAE and coordinated with the entities of the SDPAE generating a strong appropriation.
- The DPAE was restructured, adopting an internal organisation corresponding to the methodological and conceptual structure of the Plan.
- Once the initial stage of development and implementation is finished, the instrumental and scenario agendas are applied, and the internal and management procedures needed for the new approach developed.

Activities:

Ex.

- Revision of policy and planning background.
- Analysis of the existing mode of planning, organisation and management.
- Definition of territorial and sector scenarios.
- Organisation of technical teams by scenario and instruments.
- Restructuring the DPAE.
- Development of the Pressure-State-Response models by scenario.
- Construction of the agendas by scenario and instruments.
- Internal coordination (DPEA) and external (SDPAE) of the agendas.
- Development of processes and procedures for the new structure.
- Development of the agendas in the scenarios with key actors.

Approximate budget:

Since the majority of the process is an internal development, with personnel from the DPAE supported by a consultation group, the cost is reduced.

- Support and formulation: US$135,000
- Coordination workshops SDPAE: US$15,000

INSTRUMENT 4 DISTRICT PLAN FOR EMERGENCY PREVENTION AND ASSISTANCE [PDPAE]. COMPREHENSIVE RISK MANAGEMENT METHODOLOGY BY PARTIAL SCENARIO

Continuation...

Potential:

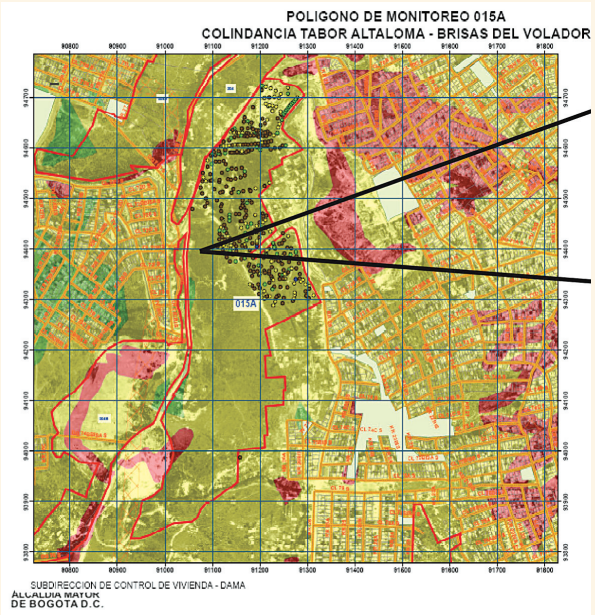
The management method by partial scenario coordinates management in the different areas, socioeconomic processes and groups of key actors where risk is generated, where it can really be valued, decided and managed. Expansion in the generation of agreements and of specific instruments for the modification of generating behaviours and the construction of response capacity in specific scenarios of territorial and economic development of Bogotá'e1 is expected for the implementation of the plan.

Limitations:

The main limitations are the habits of perception and work of the technicians, who are used to perceiving risk management as a technical-administrative-legal task, and not as a social process to be catalysed and directed from the institutions. The emphasis on hazards and on the instruments of intervention has led to a poor construction of a language and habits to work on risk generation.

Proposals for improvement:

The plan still needs intense development work and reclassification of processes and procedures to reinforce new habits and perception, definition, communication and work routines inside and outside the DPAE.



INSTRUMENT 5 INTER-INSTITUTIONAL NETWORK OF PREVENTION AND CONTROL OF ILLEGAL DEVELOPMENTS

Objective:

To coordinate the different administrative and legal offices in the district and the nation, in an attempt to prevent and control informal developments that may occur in areas susceptible to illegal development in the Capital District.

Institution or organisation that implements it:

Coordinated by the Secretaria Distrital de Habitat (Housing Secretariat)

Implementation:

The network has been gradually built up since the year 2000 by the Subsecretaria de Control de Vivienda (Housing Control Sub Secretariat), at that moment an office that depended on the Secretarí'eda General de la Alcadí'eda Mayor (Secretariat of the Main City Hall). Its actual structure was formalised with Decree No. 328 in 2003. The Sub Direcció'f3n de Control de Vivienda was moved to the DAMA (Environment Department) in 2003. With the recent restructuring, the Secretaria Distrital del Habitat that includes in its functions the coordination of the network was created.

Background:

The control of illegal developments was traditionally carried out by the local City Halls, with the occasional support of the Aqueduct (in patrols), the DAMA (in protection areas) and the Defensorí'eda del Espacio Pú'fablico (Public Space Defenders Office). Since the POT and the creation of protecting areas, the need for greater participation of entities in the control of illegal urbanisation became evident. Some judicial sentences that between 2001 and 2001 established an historical antecedent sanctioning notorious illegal developers also contributed.

Results:

- Early detection and timely police intervention have increased in 223 critical areas of pressure and illegal occupation, covering 2,566 hectares, with the participation of 12 district entities and 12 local City Halls.
- The support given to the Local City Halls has been notoriously reinforced with regard to police control of occupation and informal construction.

Activities:

- Coordination of the critical sites network, monitored by the participating entities.
- Collection of in situ proofs regarding illegal sales to start investigations and sanctions.
- Community awareness to prevent purchases of illegal plots.
- Identification and notification to the owners of the most extensive lands vulnerable to illegal development, informing them about their responsibility in preventing illegal occupation.
- Regular monitoring through field trips in the defined areas susceptible to occupation. Amongst these are high landslides or flood hazard areas.
- Elaboration and updating of the single monitoring map and the handover of areas to the responsible entities according to their competences.

Approximate budget:

- Design and coordination of the network: US$40,000
- Network operation: US$200 per point per month
- Derived legal processes: variable according to the case, but it is an important cost.

Potential:

- As well as being a monitoring mechanism and police control, the network could also be an educational tool with high social impact, if sanction and dissemination strategies with high symbolic-educational content are adopted in the approach of raising-community-culture characteristic of Bogotá'e1.
- In addition, it constitutes an instrument of risk prevention by controlling occupation of areas affected by natural hazards, protecting lives and possessions of the population, and optimising resources that the district would have to invest in the recuperation of the areas and mitigation of the risks.

INSTRUMENT 5 INTER-INSTITUTIONAL NETWORK OF PREVENTION AND CONTROL OF ILLEGAL DEVELOPMENTS

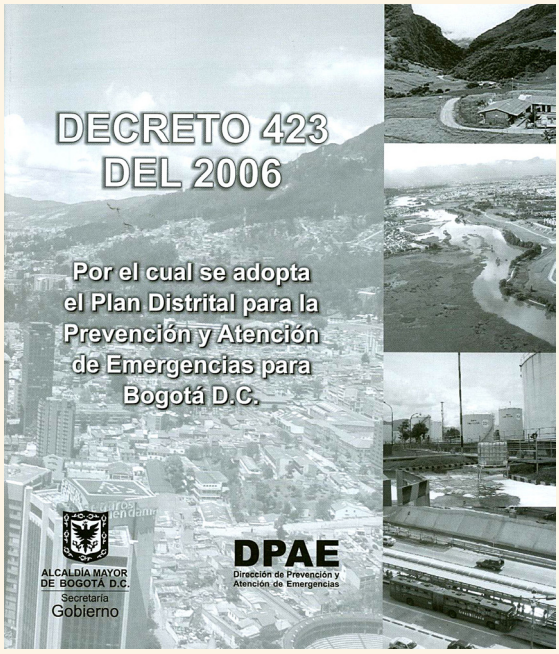
Continuation...

Limitations:

- The national regulatory framework on illegal occupation and construction presents weaknesses that make control difficult.
- The need for more legal capacity to encourage and finish the legal processes that start thanks to the control.
- The pressure for illegal occupation increases as the developable land in the Capital District is almost exhausted and while there are no low-cost housing solutions.
- Any increase of control in Bogotá'e1 moves the abuses to nearby municipalities with whom there are neither cooperation mechanisms for control nor coordinated planning of the territory

Proposals for improvement:

- The new Secretarí'eda del Habitat (Housing Secretariat) and the Pacto por un Habitat Digno (Pact for a Decent Home), subscribed by the different entities and various private actors should lead to the strengthening of prevention and control.
- The District Policy on Comprehensive Management of Protecting Land will encourage the development of alternative uses on areas with higher pressure for informal occupation, to exclude the particular illegal uses through group appropriation.



INSTRUMENT 6 METHODOLOGY OF RISK EVALUATION. TECHNICAL STUDIES AND CONCEPTS

Objective:

To determine and qualify the existing hazard and risk in a determined area, and the state of the existing structures; identifying, from a cost-benefit analysis, the relevant mitigation measures (land use, work, and relocation, amongst others).

Institution or organisation that implements it:

DPAE

Implementation:

The methodology has been developed and applied by the DPAE, mainly on hillside areas. Its definitive standardisation dates back to 2002.

Background:

The methodology was developed from the revision of different methodologies applied at a national stage, and adjusted through studies carried out in Bogotá'e1.
From the regional studies and the local evaluations, different sectors are prioritised for the execution of detailed studies, which later on will be used to develop technical concepts that define mitigation measures based on the programmes developed in the District and according to the instruments of land management.

Results:

- Technical assistance. All the areas reported by alarms, complaints, or request by entities or private individuals are evaluated rapidly generating a diagnosis and recommendations, these automatically trigger responses in terms of behaviour control, specific interventions, or implementation of more complex management processes.
- Technical concepts. Definition of land use based on the hazard and/or risk condition. Delimitation of the high hazard and high mitigable and non-mitigable risk areas; this is used to establish the areas to be declared as protected land due to risk, and then mitigation and relocation are decided.
- The concepts elaborated, based on the studies and diagnosis, determine the viability of the specific uses and projects, as well as the legalisation of the settlements and the presentation of public services.
- Those who stay, return or leave, do so on a technical and objective basis complied by all the entities.

Activities:

- Reception and programming of requests.
- Make technical visits.
- Elaboration of the diagnoses.
- Elaboration of technical concepts for the entities.
- Development of more detailed studies in the cases that may need it.
- Monitoring the evaluated areas.

Approximate budget:

- Cost per diagnosis: US$100.
- Cost per concept: US$500 (depending on the area and its complexity).
- Cost per study: US$6,000 – US$25,000, depending on the area and its complexity.

Potential:

More active involvement from the local communities in certain case studies or diagnoses would include socialisation in the information and the collective construction of knowledge, which would improve the inclusion of risk in the culture and the correction of the generating behaviours.

INSTRUMENT 6 METHODOLOGY OF RISK EVALUATION. TECHNICAL STUDIES AND CONCEPTS

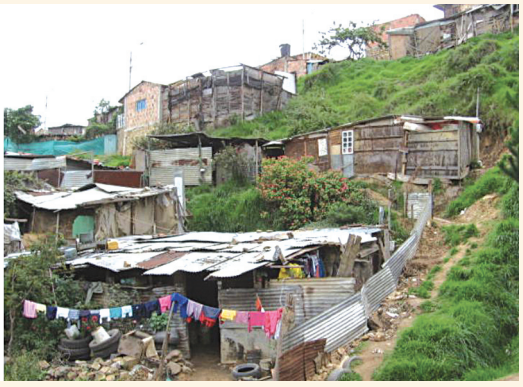
Continuation...

Limitations:

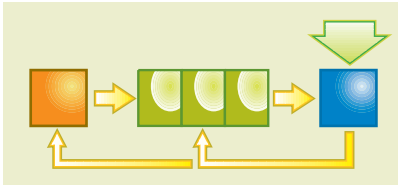
- The high cost that represents obtaining basic high quality information, historical registers for statistical evaluation of the behaviour of determinant factors in the configuration of hazard situations, limits the coverage in the knowledge of hazard and risk conditions in areas that require such studies in the city.
- The complexity of the analysis of social vulnerability to efficiently include it into risk analyses, which would allow expand the scope of non-structural mitigating measures.
- The flow of correspondence overwhelms the entity's response capacity and distracts attention from the vision of the scenario and the identification of dynamics that underlie the increase in cases.

Proposals for improvement:

- Standardise the criteria applied in the different evaluation methodologies developed in the studies.
- Make the most of the technological tools to facilitate access to information so that the decision-making processes will be optimised.
- Include, in a more efficient way, the analysis of social vulnerability in risk evaluations.
- Standardisation of the procedures of recommendation-decision-intervention that follow evaluation, to optimise resources and unify responses.



3.3. MANAGING UNSAFE CONDITIONS



In this section we will focus on the identification of those practices and instruments applied by each city to correct risk conditions once they have been generated, trying to reduce its accumulation in the informal settlements on the hillsides, and those instruments used in the attention of emergencies.

3.3.1. CORRECTIVE MANAGEMENT

The correction of the risk present in informal settlements on the hillsides has two alternatives: mitigation work and relocation of the population.

Mitigation work

The definition of these measures starts with a standard procedure of diagnosis in the area, where the existing risk and the habitability of the housing are evaluated. This diagnosis determines:

- It is necessary to evacuate some families to temporary shelters, which may be relatives´ dwellings or neighbours´, or rented accommodation obtained by the DPAE.
- It is possible to satisfactorily mitigate risks through work of geotechnical stabilisation, hydraulic regulation or the correction of the methods of implantation of the existent structures (anti-technical cuts, badly contained landfills).
- Part, or the whole affected area can be qualified as high non-mitigable risk area, therefore the relocation of some of the affected homes will be necessary.

Ecological restoration

Another important and complementary instrument for the physical correction of risk conditions is the ecological restoration. This consists of a group of strategies and techniques to start, accelerate, and guide the natural regeneration of the original ecosystems, starting from the acknowledgement, imitation and manipulation of the mechanisms of the ecological succession.

The Capital District is the national leader in scientific and technological development of ecological restoration. The District Protocol of Ecological Restoration and the technical guidelines for restoration that derive from this protocol, are instruments appropriate for the comprehensive management of the main ecological structure (protecting areas, hydraulic patrols and similar) from the same POT.

The ecological restoration practices not only allow the use and conservation of biodiversity, they also reduce the costs of intervention and maintenance, since the treatments are amplified by the self-reproduction of the ecological structures created and by the impulse of the local ecological processes.

Relocation of the population located in high non-mitigable risk areas

The technical diagnosis carried out by the DPAE for the POT (Decree No.619 in 2000), identified 4,200 affected families by high physical risk, distributed by locality as follows: Usaquén 100, Chapinero 55, Santa Fe 400, San Cristóbal 1,090, Usme 485, Suba 50, Rafael Uribe 540 and Ciudad Bolívar 1,480, making a total of approximately 25,000 inhabitants. Most of them are settled on informal borders of the hillsides, except for Suba, an area that is mainly alluvial. This information has been complemented in such a way that by March 2007 a total of 8,245 families had been included in the relocation programme for high non-mitigable risk; 4,303 of these families have already been relocated. The detailed progress of the programme is shown in Graphic 18.

When the diagnosis or study of an area, carried out by the DPAE, determines the existence of high non-mitigable risk, it also identifies, simultaneously, the areas, properties and families that should be included in the relocation programme. Once the families are identified, the Caja de Vivienda Popular del Distrito (District Social Housing Authority) is in charge of the relocation.

The Phases of intervention established in the methodology are:

'Before' phase: Includes the Comprehensive Diagnosis and the Formulation of an Action Plan, with the aim of assessing the families and the sector to be intervened.

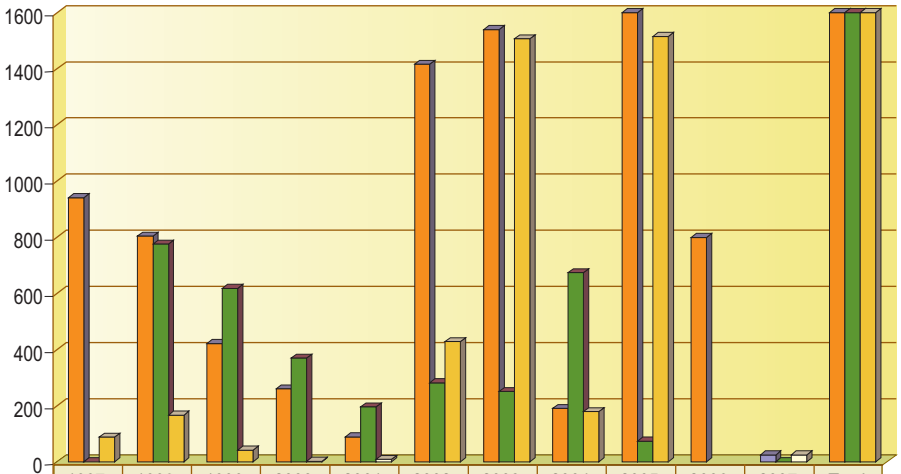
'During' phase: Contains the execution stages themselves, through the guidelines of the components and the definitive relocation of the families to alternative accommodation. This may be safe, viable, healthy and sustainable. Equally, the recuperation of the intervened area to establish land use, determined in the POT.

'After' phase: It consists of the evaluation and monitoring of the results of the progress made with each family, verifying the restoration of the conditions and measuring the impact of the programme.

The basic points of this programme are:

- Immediate evacuation of the family to a temporary shelter when the house is qualified as inhabitable.
- The property and the person are entered on the database of the relocation programme, which is part of the Information System for Risk Management and Emergency Asistance (SIRE).
- The processes of acquisition of property (study of titles, topography, appraisals) is started by the Caja de Vivienda Popular.
- Payment of an amount of money for the demolished house, Valor Unico de Reconocimiento (Unique Acknowledged Value) defined, by norm, as a minimum of 50 times the minimum wage, and a maximum given for the appraisal of the house. These resources in cash are destined exclusively to the purchase of the replacement house; the Caja de Vivienda Popular provides comprehensive support.
- The relocation of the families in conditions that should be equal to or better than the previous ones.
- The relocation, whenever possible, should be in areas close to where the family has relatives as well as social and economic connections, so as to facilitate their adaptation and maintain the social network.
- Any relocation process passes under a comprehensive support that covers technical-property (selection of the new house), legal, social and financial support.
- People identified as of high social vulnerability are linked to special programmes of the Secretaría Distrital de Integración Social, aimed at single mothers, the elderly, children, amongst others.
- To prevent reoccupation in high-risk areas, the POT orders that the evacuated properties enter a refurbishment programme (demolition, fencing, signage) carried out by the DPAE, inclusion into protection land by resolution of Secretaría Distrital de Planeación (District Planning Secretariat), and adaptation as a public area. With this purpose, agreements with entities such as the Environmental Secretariat or the Botanic Garden were developed.

NUMBER OF FAMLIES INCLUDED IN THE RELOCATION PROGRAMME PER YEAR GRAPHIC 18



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Included	941	804	421	260	89	1416	1540	190	1650	853	25	8245
Finished	0	776	618	369	196	281	251	752	557	503	Sin I.	4303
In Process	88	167	42	2	9	428	1507	179	1515	798	25	3942

Included: Families included in the relocation programme due to high non-mitigable risk, identified by the DPAE.
Finished: Families that have finished the relocation process.
In Process: Families that are currently advancing the relocation process.

Comprehensive improvement of neighbourhoods and housing

Comprehensive improvement is one of the five town-planning treatments used in the land use planning of the city and its area of expansion, according to the Law No. 388 in 1997 or Ley de Desarrollo Territorial (Territorial Development Law).

Following the guidelines of the POT, the objective of the programme Mejoramiento Integral de Barrios, coordinated by the Caja de Vivienda Popular of the district, is to develop processes of comprehensive development and territorial and social inclusion of the illegal peripheral "barrios", so the benefits and services that the city offers also reach the people who live there and improve the physical condition of their environment, their quality of life, their access to rights, their coexistence and relationship with the institutions.

The programme tackles environmental, risk, social, economic, infrastructure, and legal aspects; it is a difficult comprehensive and institutional approach in which many institutions of the district take part.

The main lines of action include:

- Town-planning management.
- Water Management.
- Accessibility.
- Environmental protection and risk mitigation.
- Equipment of the community.
- Housing.
- Participatory planning.
- Strengthening the organisation of the community.
- Coexistence and public safety.
- Productivity (generation of income, enterprise and employment).
- Planning and management.
- Monitoring and impact.
- Administrative and financial Strengthening
- Inter-institutional coordination.
- Local planning management.

Reinforcement of the infrastructure

The programme of structural reinforcement takes on constructions from the entities of the Capital District, mainly schools, communal halls, and health centres. However, it is expected to extend it to promote the reinforcement of particular housing constructions, or for other uses.

The current reinforcement programme includes an inventory and diagnosis of the structures and prioritisation of those that are intervened each year, according to the available budget in the responsible entity.

The difficulties of these measures include:

- The demand for technical assistance to the DPAE, when the technical aspects are the responsibility of the entity that owns the property.
- The pressure to reinforce structures that should be demolished and relocated, due to the impossibility of paying for a new construction, or to find a property appropriately located considering the functions and the users.

Plans of morphological and environmental recuperation (quarries)

One of the main risk generating factors on the peri-urban hillsides of Bogotá is the mining of quarries of construction material (sand, stone, and "recebo", the local name for stone-clay, aggregates for bases and tarmac).

When these exploitations have legal mining titles, given by Ingeominas (National Regulating Body), they should also have a Plan de Manejo Ambiental de la Minería (Plan for the Environmental Management of Mining), approved by the environmental authority in charge, which would be the Secretaría Distrital de Ambiente inside the urban perimeter, or the CAR if the area is within rural territory. That plan gives priority to aspects such as hydraulic and geotechnical management for the prevention of internal risks of the mining operation or public towards the environment.

If there is no a mining title, the owner is "obliged" to present to the environmental authority and start a Plan de Recuperación Morfológica y Ambiental (Morphological and Environmental Recuperation Plan). This plan allows extraction and commercialisation of materials, according to the approved profiles of the plot.

Although the basic mechanisms have been optimised, there is still a need for adequate technical and regulatory development.

INSTRUMENT 7

RELOCATION OF FAMILIES UNDER HIGH NON-MITIGABLE RISK

Objective:
To guarantee the protection of the fundamental right to life and the improvement of the quality of life for families located in high non-mitigable risk areas by landslides and/or floods, and contribute to the planning of the territory through the recuperation and inclusion of these areas to the main ecological structure and to the system of public space in the city, using processes of joint responsibility between the State and the population.

Institution or organisation that implements it:

The DPAE identifies and includes the families in high non-mitigable risk, and the Caja de la Vivienda Popular of the Capital District coordinates and carries out the relocation process.

Implementation:

The administration of the district started the relocation processes after events such as the one in 1994, when unusual storms of high intensity in the southeast of Bogotá'e1 pulled material from a quarry in El Zuque district. This generated the obstruction of the waterway of the Quebrada Chiguaza causing an avalanche that left six dead, one missing person, sixty homes were destroyed and 822 people were affected. In 1996, the district administration asked the UPES (now DPAE) and the CVP to make an inventory of the families located in high-risk areas; this inventory was made by area and had the aim of identifying 2,000 families in the localities of San Cristobal, Usaquen and Rafael Uribe.

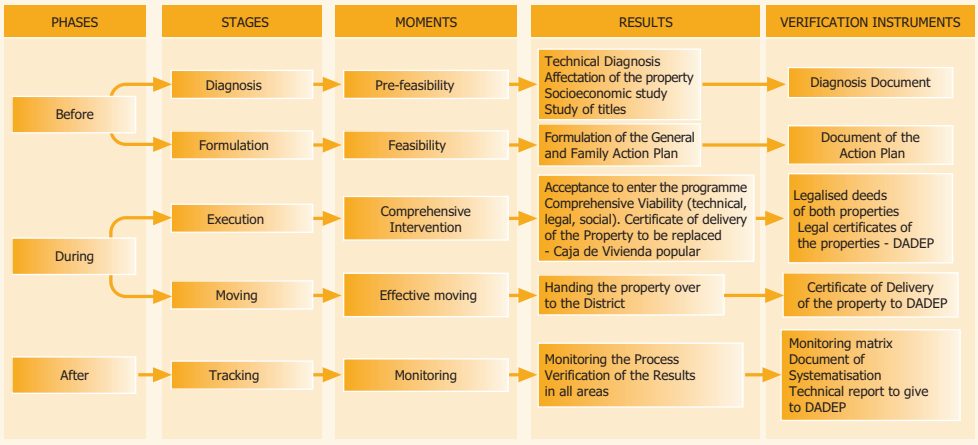
Background:

The relocation programme of the district was initially created on the basis of the experience of national entities, and was then perfected for the urban environment.
In 1989, with the 9th Law, an obligation for the Mayors is established to make an inventory of human settlements in high flood risk areas or areas subject to collapses and landslides. Also relocation programmes in those areas had to be started. Subsequently, Law No. 388 in 1997 states that in the urban component of the land use plan there should be mechanisms for the relocation of the human settlements located in high-risk areas. In this sense, the Capital District in the POT in 2000 included guidelines, strategies and programmes to assist the population settled in high-risk areas.

Results:

- From 1996 to now, the DPAE has included in the relocation programme 8,245 families located in high non-mitigable risk areas, of which 4,303 have already been relocated and 3,942 have started the process.
- With all this, the vulnerability of more than 17,000 people has been reduced, they have also improved their quality of life and more than 30 hectares of land have been recuperated.

Activities:
The following diagram summarises the main activities of the relocation programme:



INSTRUMENT 7 RELOCATION OF FAMILIES UNDER HIGH NON-MITIGABLE RISK

Continuation...

Approximate budget:

Each relocated family receives a Unique Acknowledge Value (Valor Unico de Reconocimiento) equivalent to 50 times the monthly minimum wage ($ 433,700 = US$195), which today can be calculated in US$ 9,724 per relocated family.
The cost is greater if the appraisal of the property is higher than the above number. Management costs, support, studies, etc, which vary in each case add to all the above.

Potential:

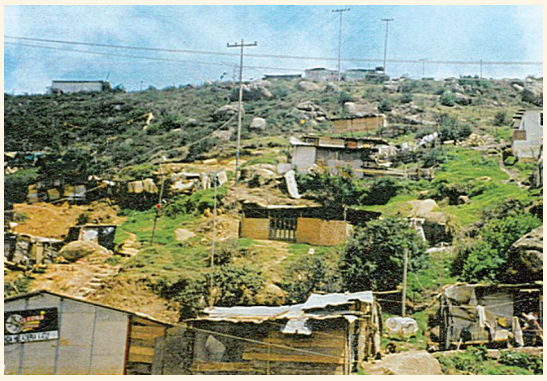
The relocation programme would have a bigger scope if it was part of a comprehensive process of local rearrangement based on participatory land planning and public appropriation of protection land.

Limitations:

- The lack of coordination between national and district housing policy with the relocation programme slows down the process, since one of the main difficulties is the deficiency in housing supply to which to move the families.
- The institutional coordination to achieve a comprehensive intervention that would respond adequately to the demands and needs of the programme's target population is incipient.

Proposals for improvement:

- The Capital District needs to develop a planning and development strategy of the peri and suburban interfaces; inside this strategy the relocation programme would have a defined horizon and a sense of efficiency and effectiveness.
- Consolidate within the phases of the process, the issues of rehabilitation or restoration of the intervened areas, to incorporate them into the public space and then generate alternative uses, depending on the needs of each specific sector.



INSTRUMENT 8 COMPREHENSIVE IMPROVEMENT OF "BARRIOS"

Objective:
To guide the complementing, reorganisation or adaptability actions required in both the urban space and the housing units that are part of the illegal settlements located in the peripheries of the city.
All the above with the aim of correcting the physical, environmental and legal deficiencies generated, because of their origin, outside urban regulations; and enabling its inhabitants to have access to the urban quality life defined for the whole city.

Institution or organisation that implements it:

Coordinated by the Caja de Vivienda Popular in the Capital District.

Implementation:

Comprehensive improvement is developed on the basis of the POT as an instrument for town-planning treatment of the same name, foreseen in the Territorial Development Law (No. 388 in 1997, framework of the POTs). The programme collected the experience from previous administration projects aimed at coping with marginalisation, incorporating experiences and progress into a single process. From the 35,232 hectares of urban land defined in the POT around 6,906 hectares have been urbanised illegally, which is equal to 20%. This area corresponds to 1,553 "barrios" where almost 401,285 properties are located, and occupied by approximately 1,400,000 inhabitants. Another 1,107 hectares vulnerable to occupation by illegal developments have been identified.

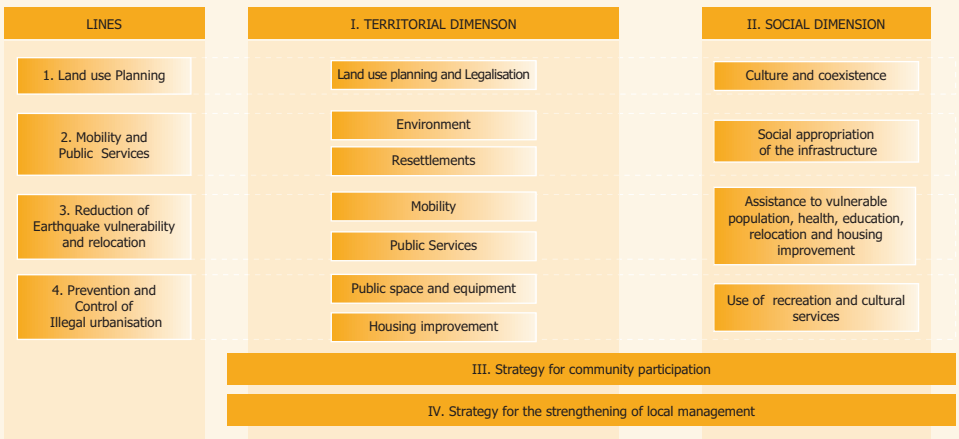
Background:

From the analysis of previous experiences and responding to the definitions of the POT and the Plan de Desarrollo "Bogotá'e1" (Bogotá'e1 Development Plan), the PMIB is structured and institutionalised appointing the Caja de la Vivienda Popular its coordination, and to the rest of the entities in the district the execution of each sector component or action, according to their respective capacities.

Results:

- Approximately 500 "barrios" have benefited from the programme. These are located in Zone Planning Units distributed in 12 localities of the Capital District: Usaqé'e9n, Chapinero, Santa Fe, San Cristó'f3bal, Usme, Bosa, Kennedy, Suba, Rafael Uribe and Ciudad Bolí'edvar.
- More than 1,860,000 inhabitants have been benefited.
- Therefore, these are not specific projects, isolated in an entity or area; but rather this is a large-scale programme that integrates the actions of many entities from the district to totally correct the determinants of social marginality, and urban fragmentation.

Activities:
The outline for the management of the operative development of the programme was structured under the following statements: two dimensions, territorial and social; two cross-cutting strategies: participation of the population and strengthening local management. This type of operation is determined by four lines of intervention.



INSTRUMENT 8 COMPREHENSIVE IMPROVEMENT OF "BARRIOS"

Continuation...

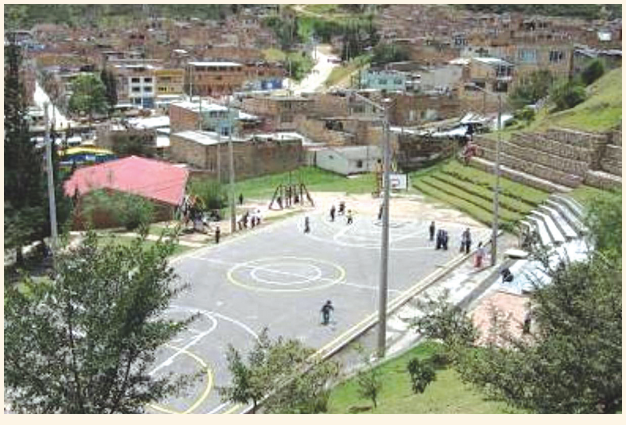
Approximate budget:

Institutional Strengthening	US$ 1,823,922
Territorial works	
Zoning	US$ 890,254
Water Management	US$ 32,448,108
Environment and risk prevention	US$ 1,775,100
Mobility	US$ 60,975,135
Community facilities	US$ 9,137,291
Housing	US$ 9,628,761
Social	
Participatory planning	US$ 656,771
Strengthening the organisation of the community	US$ 697,694
Coexistence and safety	US$ 1,458,961
Productivity and employment	US$ 1,221,494
Tota	**US$ 120,713,490**

Potential:
The treatment of comprehensive improvement, with the participating entities, the type of intervention and the investments used could be more efficient if an early intervention was made to guide their development from the beginning.

Limitations:
The comprehensive improvement of an informal "barrio" can cost as much as five times what it would have cost to formally develop it, and the costs are even higher on the hillsides.

Proposals for improvement:
- A strong policy for the restriction of occupation on the hillsides needs to be complemented with the adaptation of the land in other areas; for this it is necessary to make the intervention and investment that the entities from the district would make in neighbouring municipalities legally and politically viable, with an outline similar to the comprehensive management programme.
- Additionally, Bogotá'e1 needs to develop technology in the areas of town planning, engineering (networks) and architecture for the conditions on the hillsides, in case some of them will be occupied and the settlements will need to be improved or guided.



INSTRUMENT 9 HOUSING IMPROVEMENT

Objective:

To reduce earthquake vulnerability of informal housing, so that the life and patrimony of the families are guaranteed. This by developing policies that would advise, educate, and coordinate the owners of the informal housing within the regulations and the current construction processes, in housing repairs, thus counteracting their structural deficiencies.

Institution or organisation that implements it:

The Caja de la Vivienda Popular executes this programme.

Implementation:

The initiative focus on:

- Homes in the socioeconomic strata 1 and 2.
- Homes located in the 26 UPZ of Comprehensive Improvement identified in the POT of the city for 10 localities of the Capital District.
- Homes that have ownership title of the property to be improved.
- Homes located in consolidated buildings only to the first floor.
- Homes that meet the requirements to apply for national or district subsidies.

Background:

- The low coverage and the limited scope of housing policy, mostly directed to support financially the modes of formal construction, which have subsidies, has meant that the families do not have access to formal sources of financing.
- Localisation of urban sectors in high landslides or flood risk areas, this added to the precarious conditions of the constructions, generates high vulnerability rates.

Results:

- 4,000 houses have been improved
- 3,500 properties have been recognised.

Activities:

- Develop projects with architectonic and structural design of informal houses, harmonised with the construction regulations in force. Establish agreements with Urban Planning Offices for the approval of requests for structural reinforcement, enlargement and basic sanitation, in solutions of progressive development in order to obtain construction acknowledgement.
- Support to the families, object of the identification of structural deficiencies, and development of proposals that would help to overcome these deficiencies.
- Awareness campaigns on earthquake risk.
- Training courses for construction experts.

Approximate budget:

- Operation: US$1,300,000, which includes: technical assistance, experts' surveys, audit processes and support.
- Work: US$ 6,300,000, which come from other financing sources via district or national subsidy.

Potential:

- Acknowledgement of the importance of this issue within all the entities of the housing sector.
- Tightening of regulations relating to housing acknowledgement.

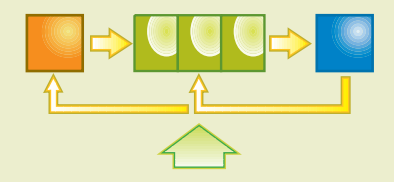
Limitations:

- Adjustments in the regulations, particularly with regards to housing acknowledgement that would speed up their execution.
- The obstacles faced by the family to obtain financial resources to pay for the paperwork in the Urban Planning Offices in order to carry out the necessary improvements in the house.

Proposals for improvement:

- Strengthen the modality of micro-credit to achieve 100% reinforcement of the houses.
- Typology and intervention alternatives of the houses.

3.4. EFFECTS MANAGEMENT



Managing the effects means the preventive development of mechanisms to deal with emergencies, and to speed up recovery in the areas affected by major or minor events.

3.4.1. EMERGENCY ASSISTANCE AND PREPRAREDNESS

Since landslides are, historically, the most frequent type of emergency in Bogotá, and that risk management has been traditionally centred in the evaluation of risk-preparedness-response in emergencies; Bogotá has a strong system for dealing with events of these type and magnitude.

Strengths in emergency assistance

The main strengths of the emergency assistance system are as follows:

- Constant evaluation of areas under threat.
- Response protocols.
- Unified command station in each emergency.
- Permanent reserve of equipment, tools and first aid supplies.

However, the main strength is the existence of the Fondo de Prevención y Atención de Emergencias (Fund for Emergency Attention and Prevention), created by the District Council Agreement No. 11 in 1987, and regulated by Decree No. 652 in 1990 by the Mayor. This Fund is accumulated by the income from a "annual obligatory inclusion of an amount of the budget of the district, no less that 0.5% of the tax common income of the Central Administration" (Sec.7, Agreement 11/87.). Another strength is the existence of the DPAE, where all the operative, technical, and management entities are articulated to coordinate and carry out the actions according to the capacity of each institution.

Dealing with Forest Fires

For the coordination of prevention and assistance work of forest fires recurrent during dry season (August-September, and particularly January-February) Bogotá has a Comisión Distrital de Incendios Forestales (Forest Fire Commission). This commission groups the entities related to the management of vegetation cover on the hillsides (Environmental Secretariat, Botanic Garden, Aqueduct, CAR) as well as those related to the response to events (DPAE, Fire Brigade, Civil Defence, Police).

The work of the Commission has allowed the development and institutionalisation of practices on preventive management, the implementation of education campaigns on prevention, and the strengthening of response procedures and methods.

An interesting aspect of the commission's activities is that in the preventive forestry management work, it uses people from high social vulnerability groups, linked to the work of social management entities in the District: the very poor, young addicts in rehabilitation.

The Earthquake Response Plan (PRT)

The formulation of the PRT has been recently finished; this plan presents a number of measures to strengthen response capacity in any large-scale event, not just earthquakes. These measures are grouped in nine action lines:

1. Damage scenario.
2. Organisational outline.
3. Logistics system.
4. Information and communication systems.
5. Population awareness and public information.
6. Training.
7. Legal Regulations.
8. Recovery.
9. Financing strategy.

The implementation of this plan represents a significant qualitative and quantitative improvement, with which the district goes from the capacity of response built historically, for the type and magnitude of the most frequent emergencies, to a closer preparation for an event of great magnitude, which at the same time provides it with the capacity to deal comfortably with the most common events.

3.4.2. RECOVERY

Defined as the "process of recovery of the areas and/or functions affected by an emergency, calamity, or disaster, for the reestablishment of socially acceptable and sustainable functions in the life of the population, the reduction of existing vulnerabilities before the emergency and the intervention of territorial and sector processes that generate new risks" (Sec. 3, Decree No. 423 in 2006).

This is the least-developed aspect of risk management in Bogotá, perhaps because this city has not had to face large-scale disasters that have generated any reconstruction experience, with the only possible exception of the political disorder after the murder of Jorge Eliécer Gaitan, on the 9th of April, 1948 in a wave of violent protests, murders and fires known as "el Bogotazo".

Today the first Plan de Recuperación for Bogotá (Recovery Plan) is being revised; this plan has been agreed between the Secretaría Distrital de Planeación (Planning Secretariat) and the DPAE.

3.4.3. FINANCIAL PROTECCTION

Bogotá has made notable progress in the area of financial progress in the last few years.

The main entities in charge of development and maintenance of the urban infrastructure, such as Aqueduct and the IDU[7], have worked for years on the insurance of their work. The reduction of the premiums stipulated in these policies, for protection and reinforcement work, has become an important incentive to make the proposals of these entities viable, leading to an "oleada" or wave of reinforcement work in the city. This also applies to private operators of domiciliary public services, obliged by regulation to ensure their networks.

In 2006 the bases for a financial protection system in the Capital District, coordinated between the DPAE and the Secretaría de Hacienda Distrital (District Finance Secretariat).

In the near future, progress should be made in the promotion of financial protection for structures and productive processes of private property, in the event of a disaster.

Managing media, political and institutional effects

The measures to ensure governance during an emergency are on the same scale as the current assistance mechanisms; that is for the commonest minor events in the city. The assistance protocols for these cases include the procedures to be applied by the Metropolitan Police in Bogotá, which are the isolation of the area and the restriction of access.

7. Instituto de Desarrollo Urbano (Urban Development Institute) in charge of road infrastructure in Bogotá.

The development of plans and measures of greater importance, adequate to the management of events of great magnitude is included in the development of the PRT.

There is at present no formal strategy for the management of resources and political authority during and after an emergency, other than some internal dispositions of the DPAE related to the regular channels and the management of information, through official press bulletins and single statements by the director of the entity.

INSTRUMENT 10 DISTRICT PROTOCOLS FOR EMERGENCY RESPONSE

Objective:

They were designed to be used by the Specialised Response Groups in the different types of emergency. They do not replace the training and capacity. They are a general guide to establish the steps in the process of coordination and attention.

Institution or organisation that implements it:

They have been developed by the DPAE and are implemented by the first-aid organisations and the police of the Capital District.

Implementation:
The current version was published in 2003. The organisations that participated in its development were: Secretarí'eda de Salud del Distrito Capital (Health Secretariat), Fire Brigade of Bogotá'e1, Bomberos de la Aeroná'e1utica Civil (Aeronautics Fire Brigade), Metropolitan Police, Ministry of Transport, Red Cross from Cundinamarca and Bogotá'e1, Civil Defence of Bogotá'e1.

Background:
The response protocols were created from the revision of similar international manuals, but mostly from the evaluation of the experience of Bogotá'e1 on dealing with its own emergencies.

Results:
- The protocols cover different types of emergencies. They are followed thanks to the training of specialised response groups and first-aid organisations, and coordination of each emergency from a Unified Command Station.
- The main results are observed in the reduction in response times and the reduction of deaths and injuries during emergencies.

Activities:

- Review of the response manuals or procedures of the entities involved in each type of emergency.
- Review of international experience.
- Inter-institutional evaluation of historical management of each type of emergency.
- Formulation of the response protocol.
- Inter-institutional agreement on the protocol.
- Inter-institutional dissemination and training for specialised groups.
- Continuous application, evaluation and improvement.

Approximate budget:
- Revision, evaluation and formulation: US$16,000
- Agreement, dissemination: US$5,000
- Training specialised group: US$10,000
- Resources for specialised group: varies depending on the type of emergency.

Potential:
The emergency protocols have the potential to be adapted to generate similar guides, not for specialised response groups, but for first respondents: local organisations, personnel from companies, local authorities, and operative personnel from the entities in the field. This would enable the expansion of response capabilities especially in the event of a large-scale, where specialised groups would not be enough.

Limitations:

The most difficult part in the elaboration and adoption of a protocol is the agreement and unification of methods between institutions. The more institutions participate, especially if they are not from the district, the more difficult it becomes.
The operation and sustaining of specialised groups is an expense that increases when more protocols, specific for other type of emergencies, are implemented, and the training of new groups is required.

Proposals for improvement:

- It would be convenient to link more closely the formation of "Brigadas barriales" (neighbourhood brigades) and enterprise brigades, to the specific response procedures for certain type of emergencies.
- It would be convenient to integrate social management processes with the procedures for emergency assistance.

INSTRUMENT 11 SOCIAL ASSISTANCE IN EMERGENCIES

Objective:

To develop an outline of effective and coordinated response during an emergency that may occur in the Capital District. This throughout the design and implementation of plans, programmes and projects that would optimise the availability of technological, administrative, logistic, methodological, and human resources. Thus, the technical level would increase and the organisations unify the operative criteria and the procedures for the management and the attention of the aforementioned situations.

Institution or organisation that implements it:

Secretarí'eda Distrital de Integración Social. (Social Integration Secretariat)

Implementation:

The process of Social Assistance in Emergencies was strengthened from 2001, with the earthquake simulation, coordinated by the DPAE. From then on the links of coordination for the census processes, aid donations and temporary accommodation started to become stronger. Within this process other district entities were also involved: Health Secretariat, el Departamento Administrativo de Acció'f3n Comunal, Instituto de Recreació'f3n y Deporte (Sports Institute), Civil Defence, Red Cross, Community Police and the Fire Brigade.

Background:

Emergency for a landslide in the "barrio" Cerro del Diamante (Sector Altos de la Estancia – Locality of Ciudad Bolí'edvar) – April de 2002.
Response to winter flood River Tunjuelito, May 31st -June 1st and June 10th -12th, 2002.

Emergency for Landside Barrio Cerro norte – Locality Usaqué'e9n, August, 2002.

Field drill after the collapse of structures, October 9th, 2002.

Assistance to children'] in school bus accident, School Cafam, October 21st, 2002

Training and revision SUME (Unified System of Emergency Management) - December 12th -13th, 2002.

Presentation and validation of the district protocol of the first respondent in the area of impact and logistics of the PMU, June 11th, 2003.

Training on managing SUMA (Humanitarian Supply Management System) - July 7th -10th, 2003.

Desk drill for terrorist bomb attack in Bogotá'e1 - July 9th 2003.

Presentation of the system of commando of incidents to be included in the SUME- July 30th, 2003.

Preparations for national and international field drill for various simultaneous events in Bogotá'e1 - July 16th; July 30th; August 11th, 21st, 28th; September 4th, 11th and 18th , 2003.

Results:

Protocols, procedures and flow charts for:
- Census Surveying in Level 1 Emergencies.
- Census Surveying in Level 2 and 3 Emergencies.
- Classification of humanitarian aid.
- Delivery of humanitarian aid in Level 1 emergencies.
- Delivery of humanitarian aid in Level 2 and 3 emergencies.
- Systematisation of the information in Level 1emergencies.
- Systematisation of the information in Levels 2 and 3 emergencies in
- Installation and operation of temporary accommodation.
- Plan for Social Assistance in Emergencies for the Capital District.
- Guidelines for the installation and operation of temporary accommodation in the Capital District.

INSTRUMENT 11 SOCIAL ASSISTANCE IN EMERGENCIES

Continuation...

Activities:

a. identification of the affected population
Identify and characterize the total population, victim of disasters, establishing the social effect caused, as well as the networks and social mechanisms of support that it has, through an efficient and adequate census survey.
b. Delivery of humanitarian aid
Identify the humanitarian aid required by the affected population, after the census survey and make the appropriate distribution of this aid to mitigate the suffering of those affected.
c. Food Supply
Create conditions that would guarantee the availability, access and use of water and food for all the people affected by an emergency, under the principles of opportunity, sufficiency, and safety, through strategies that will strengthen the organization and the capacities of the communities.
d. Installation and operation of temporary accommodation
Guarantee the installation and operation of temporary accommodation needed to assist the population affected by an emergency, with the aim of provisionally solving the problem of shelter and housing, while the processes of rehabilitation and reconstruction are implemented, to then return to normal.
e. Community organisation for emergencies
Actively involve groups in the community, previously identified in the management of their risk, so they will become the dynamising actors of the processes of social assistance during emergencies, to receive timely attention, optimise resources and contribute to repair social dynamics.

Approximate Budget:

US$ 89,000 per year, which includes human resources, other resources, training, computing equipment, food, and clothing.

Potential:

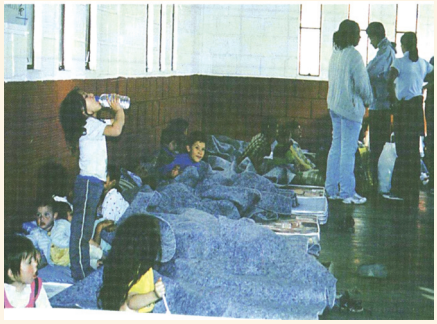
Coordinating entity of the Mesa de Atenció'f3n Social, within the PRT for Bogotá'e1

Limitations:

An agreement has not been formalised between the entities of the District System, related to the processes of social assist.

Proposals for improvement:

- Involvement of the personnel from the civil Police, the Orientadores de Movilidad, Voluntary Fire-fighters and official fire-fighters in the processes of Registering Information of people affected by emergencies.
- Reactivation of the Comisió'f3n de Gestió'f3n Social, Educativa y Participació'f3n Comunitaria (Commission of Social, Education, and Community Participation Management) instituted in the Decree No. 332 in 2004, from which the developed processes would be strengthened.



INSTRUMENT 12

DESIGN AND IMPLEMENTATION OF POLICIES, STRATEGIES, PLANS, PROJECTS AND METHODOLOGIES, IN COORDINATION WITH ENTITIES FROM THE DISTRICT, TO INCLUDE THE ISSUE OF PREVENTION AND EMERGENCY ASSISTANCE IN THE CULTURE OF THE INHABITANTS OF THE CAPITAL DISTRICT.

Objective:
To generate methodological instruments for the inclusion of risk prevention in the framework of risk management in the different communities (educational, neighbourhood, familiar) in the Capital District, so they are aware of the risks they face and reduce them.

Institution or organisation that implements it:

DPAE.

Implementation:

In practice the communities are reached through programmed workshops to train school teachers in the School Plan for Risk Management; parents in the Emergency Family Plan; organised communities in Community Risk Map. These workshops are given in all the localities of the Capital District.

Background:

Since 1999 a strong campaign for risk reduction in the educational sector has been taking place jointly with the Secretarí'eda de Educació'f3n del Distrito- SED (Education Secretariat). The training workshops are based on the need to make diagnoses of risk perception, construction of hazard concepts, vulnerability, risk, disaster, emergency and sustainable development, amongst others; a recreational approximation to natural phenomena and their connection with risk and disaster situations; the risk scenario and its interrelations with the natural, social, and built environment of the city, and in general the socio-spatial transformations that generate imbalances in the relationship between people and the environment; the POT and development plans as tools for risk management.

Results:

Around 65,000 people from the community have been trained in emergency prevention and risk mitigation through the training workshops. A total of 27,642 teachers have been trained in risk management, and 1,589 schools have established their own School Plan for Risk Management.

Activities:

- Training workshops for teachers in the School Plan for Risk Management.
- Training workshops for teachers in Evacuation Plans.
- Training conferences for parents in Emergency Family Plan.
- Training workshops for organised communities in the Community Risk Map.

Approximate budget:
The annual budget is:

- School training: US$ 83,000
- Community training: US$ 52,000

Potential:
The training of the community is a tool that allows prevention and preparation of the population to face an emergency situation. This training can achieve greater efficiency through virtual training accessible to the community.

Limitations:
Only a handful of people are in charge of developing this training and they are not enough to cover the size of the population in the Capital District.

Proposals for improvement:
Expand coverage through agreements with entities from the SDPAE to train the community on risk management.

INSTRUMENT 13 HYDRO-METEOROLOGICAL MONITORING NETWORK OF BOGOTA [RHB]

Objective:

To understand the behaviour of the precipitation and the levels of the Tunjuelo River in real time, in order to prevent or reduce, through detection and early warnings, the loss of human lives and/or material goods by anticipating floods and landslides phenomena, as an alternative measure, due to the impossibility of relocating the whole of the population threatened by floods or landslides in the Southeast of Bogotá.

Institution or organisation that implements it:

DPAE

Implementation:

The project for the design, installation, and operation of the landslides and flood alert network was developed through the special cooperation agreement No. 017/1998CO between the IDEAM (Institute of Hydrology, Meteorology and Environmental Studies) and the FOPAE.

With the aim of expanding the network of hydro-meteorological stations of the district and studying climatology in the city more in depth, the agreement 550-2004 was signed between IDEAM and FOPAE.

Background:

The POT of Bogotá'e1 defines that, under the coordination of the DPAE, the hydro-meteorological monitoring network must be created to define prevention actions and early warnings.

Results:

- The network transmits, in real time, the registers obtained in the field stations to the DPAE, where the data base is fed and there is a visualisation system.
- The registers in real time are used to feed the system of prediction of the levels of the Tunjuelo River. Equally the information on rain and level are processed and analysed, becoming the main tool to monitoring the behaviour of the precipitation in the area under surveillance and of the levels of the Tunjuelo River.

Activities:

- Design of the Hydro-meteorological network of Bogotá'e1 (RHB).
- Acquisition and implementation of the field stations and the two reception bases that form the RHB.
- Design of the expansion of the RHB.
- Acquisition, installation and implementation of the station and supporting equipment for the RHB.
- Maintenance and operation of the network.
- Constant updating of the database of the stations (rain and level).
- Creation and updating of the monitoring module of the SIRE.
- Strict control of the states of alert.
- Updating and designing of the action protocols to determine the states of the different alerts.
- Development of early-warning systems.
- Continuous technological improvement.

Approximate budget:

Ex.

- Design and installation of the RBH (first phase): US$110,000
- Design and installation of the RHB (Second phase): US$195,000
- Operation and maintenance of the network: US$2,600 per month
- Constant development and updating of the module is variable.

INSTRUMENT 13 HYDRO-METEOROLOGICAL MONITORING NETWORK OF BOGOTA [RHB]

Continuation...

Potential:

Currently, mainly analysis directed to landslides alerts are carried out. However, work is being done to start alerts for landslides. Because the data series is of about 5 years, the information should be carefully processed; the more records are available, greater the reliability of the analyses. Hydro-meteorological monitoring can achieve greater efficiency, much higher than the one obtained today, through the integration of the networks from the different district, regional and national entities.

Limitations:

- Very short length of the Series.
- Insufficient data for the calibration of the models.
- Technical support and cost of repairing equipment.
- Insufficient security on certain key points that need monitoring.

Proposals for improvement:

Continuous updating of the Monitoring Module SIRE.
Agreements between district, regional and national entities that have hydro-meteorological monitoring networks.

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