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Disaster mitigation in landslide and flood prone areas of Bogota Colombia

Good Practice

New for 2002

- Categories:**
- Disaster and Emergency:
 - hazard reduction and mitigation
 - reduction of vulnerability
 - risk assessment
 - Environmental Management:
 - environmental remediation
 - Land Use Management:
 - land development
 - land-use planning

Level of Activity: City/Town

Ecosystem: Mountain

Summary

The District Capital, through the Fondo de Prevencion y Atencion de Emergencias has been working on the development of a project in special treatment zone risk reduction of landsliding and flooding, in order to, reduce risks associated to landsliding and flooding phenomena to which some inhabitants of the city of Bogotá are exposed. This initiative includes the Mitigation Works Building, as a structural measure for threat reduction, the non mitigatable high risk family resettling, as a structural measure for the reduction in vulnerability, and the adaptation of the premises evacuated in the process of relocation, as a preventive measure, as and when faced with new occupations. 87 mitigation works have been carried out between 1998 and 2001. 1341 families have been resettled and, the premises evacuated by relocated families have been adapted. The vulnerability of nearly 23.000 persons was reduced through these actions. The protection of the non mitigatable high risk soils, the zoning of threats and risks of the urban perimeter, and the prioritising of high risk resettling for the ordering of territories and the conditioning for future urban developments in high and middle risk zones has been incorporated into the legal ordering of the city.

Narrative

Situation before the beginning of initiative.

More than 6000 highly vulnerable families, settled in zones under high risk of landslides, rock falling, mud-flow and flooding. Human settlements of clandestine procedence in zones of non technical quarry exploitation, river edges, brooks and natural reserves, applying pressure to unstable terrains with clean and sewage water non technically channelled and, with deficient constructions.

Establishing of priorities.

The main criteria to prioritise the intervention is the protection of the lives of the inhabitants in high risk zones. Primarily reducing the threat with the construction of mitigation works, such as, the reformation of slopes, contention walls, terracing and drainage, among others. When the mitigation turns out to be technically, socially, economically and environmentally non viable, the resettling of families is initiated prioritising according to how structurally affected the premises are and, the living conditions, functionality and salubrity territorially intervening. Finally, high-risk premises are demolished, and they are turned over to the entities in charge of environmental control and protection.

Strategies and Goals Formulation.

The main objective is to reduce the risk to which the families that live in high risk zones are exposed, through the reduction of the risk by the construction of mitigation works and/or reducing the vulnerability through the resettlement in housing with suitable living and safe conditions. The strategy centres on the protection of life ensuring the rehabilitation of intervened zones and, preventing the illegal occupation of the lands which are the object of the resettlement. It is strategic to incorporate risk reduction to planning actions and urban land arrangement, reason for which it is co-ordinated with the integral improvement of the neighbourhoods.

Resource Placement.

The FOPAE, has made resources available since for the reduction of risks in the district. Nevertheless, during some periods, the resources from other entities have been invested, such as, Caja de la Vivienda Popular, financial entity belonging to the decentralised district government, which has provided loans to the families in the process of being resettled so that they may have access to a safe housing solution. Since the year 2000, some of the Funds for Development from the local District Government Offices assigned resources for the purchase of premises for the families to be relocated due to high risk. The FOPAE, has carried out the processes of relocation in conformity with what is stipulated in the law, combining the abovementioned resources. Through the INURBE the National Government, has given housing subsidy, according to the procedures established for the postulation, based on the certifications issued by the -DPAE-. Families that have opted for new housing projects have had the commercial valuation of the premises at risk, plus the loan obtained from the CVP, as well as, the housing subsidy from the INURBE

Process

Based on the city's threat zonification and on the Detailed Studies on Critical Points hired by the FOPAE, intervention actions have been determined in high-risk zones. In line with the recommendations by the studies carried out and the risk technical concepts by the DPAAE, mitigation works have been done according to the designs and established technical specifications, or the families have been resettled. Resettlement, as well as, works are prioritised in special treatment zones for risk mitigation studied by FOPAE, In line with what is contemplated in the law 9 1989 currently in force, known as Urban Reform Law and in legislation 388 of 1997 known as, the law of Territorial Development. The high-risk family relocation process consists of the acquisition of properties through direct negotiation, to commercial valuation of the property at risk, for which the study of title deeds and rights to be acquired is done. Valuation is carried out. Families are permanently orientated through social work concerning their process. The base negotiation offer is presented to the beneficiary. The necessary revaluations are carried out. A payment resolution is issued, and the pertinent budget process is started, in order to, make issuance of the agreed value within the contract of sale previously undersigned. The FOPAE has obtained Cap's contribution based on credit, and currently in property, legal and urban assistance, for the acquisition of replacement property. Once the properties at risk are acquired by FOPAE, these then go on to become the District's Public Use property and, non-development lands due to being soils under risk protection. These then are handed over to the authorities in charge of the protection and environmental control for their management. Whenever it has been necessary to combine financial resources, the process has included the subscription of the respective co-financing inter-administrative agreements by the entities involved. The necessary steps have also been taken to ensure the intervention of the District Entities such as the Jardí® Botá®©co for the reforestation of the sectors evacuated due to resettlement.

Achieved Outcomes

The FOPAE has done 85 risk mitigation building works between 1998 and 2001, thus, reducing the threat to which nearly 3500 families were exposed and creating more than 1400 jobs in the process. The building of mitigation works has reduced the threat in more than 40 hectares of land. The vulnerability of 1385 families has been reduced through resettlement, improving their safety conditions, inhabitability and availability of public utility services. Close to 10 hectares of land have been recovered restricting their use to soil protected due to risk.

Sustainability

In order to prevent the occupation of high threat zones by human settlements, and of middle threat zones susceptible to presenting land sliding phenomena with negative anthropic intervention, the FOPAE has prepared the component of threats and risks which structures the Territorial Arrangement Plan (Plan de Ordenamiento Territorial) -POT- which shall be run by the district for a period of 10 years. Adopted through the districts Order in Council 619 of 2000, the -POT- incorporates the zonification of threats for the 20 boroughs into which the district territory is divided, and establishes as a conditioning factor for future developments, the obligation to carry out risk studies in high and middle threat zones, as well as, the building of mitigation works as recommended and designed by the studies done. It was also incorporated into the Territorial Arrangement Plan the Special Treatment Zones for the mitigation of risks which, are high threat zones with human settlements levels 1 and 2, that is to say, with high vulnerability socio-economic conditions. The sustainability of the intervention is supported by: the strategy of information and spreading out of the same, on the high threat zones; the sensitisation of resettled communities and those that remain inhabiting the intervened sectors; in the steps taken to rehab the soils recovered through resettlement; in the co-ordinated action with the integral improvement programmes of neighbourhoods, and in the control that would prevent the illegal occupation of the districts middle and high threat zones.

Lessons learned

The threat zonification has allowed for the structuring of the Territorial Arrangement for the use, as well as, for the control and protection of soils. The legal market of development lands must be competitive with the illegal market. Information and the spreading of the same, as preventive measures are fundamental components in the implementation of risk reducing actions. A housing offer must be structured for high social vulnerability sectors. New housing is not the only housing alternative for families at high risk, whose incomes are below the minimum legal wage. Resettlement must guarantee the improvement of living conditions of families, including safety, public utility service availability and mobility among others. It is important to carry out resettlement processes with integral intervention in the territory, in order that, risk is reduced and the conditions of those remaining on the territories is improved. Through mitigation works it must be sought to reduce the threat in the city's developing areas and legalised sectors and improve the housing preventing resettlements.

Transferability

The FOPAE S resettlement due to high risk model was presented to the Mayor of This process is currently underway in this County. Many cities in the country have implemented similar models to that of Bogotá for the incorporation of the components of threats and risks in the Territorial Arrangement. The city of Bucaramanga is an example that comes to mind. Through the Fondo de Prevenci¹ Atenci¹ he Emergencias -FOPAE-, the District has been a pioneer in the processes of integral reduction of risks in the country, especially with respect to landslides. The transference of the projects of risk reduction is been done through groups such as EMI with countries like Turkey and Ecuador. In order to replicate this initiative of reduction of risks, it must first be considered as a public policy and, therefore, be implemented in the development planning and in the Urban Arrangement, as well as, in the formulation of specific investment projects. It is necessary to have a good working technical knowledge of the threats, in order to, adopt appropriate intervention measures. Geographic Information Systems (GIS) are an important tool for the reduction of risks. The resettlement of families at non mitigable high risk, is an option whenever mitigation turns out to be technically, socially, environmentally or legally non viable, and in all cases must imply besides safety, the integral improvement of the quality of living of the families. The nature reserve zone, edge zones control, and of the areas where landslides exist must be effective, preventing occupation or implementing

mitigation measures before developing. Life protection must be the basic risk reduction criterion.

Key Dates

- 29/07/1999. Landslide Activation lead to the resettling of 500 families
2. 28/06/2000. Threats -risks- structure Territorial Code Plan.
3. 9/05/2000. Local investment in resettling has been achieved.
4. 14/06/2001. Resettlement technical consultancy is obtained.

References

- 14.1 Article's title: Analysis Benefit - Cost of Measures for the Reduction of Risks due to landslide phenomena in Bogotá®
Author: PAVA, Javier et. al. Title of the journal: Geotechnia congress memory. Cartagena Colombia.
Publishing date: November 2001 Review: Analysis for the projection of public investment in the reduction of risks in special treatment zones due to landslides in Bogotá®
- 14.2 Article's title: Prevenci n y Atenci n de Emergencias en Bogot  D.C. 1998-2000.
Author: Mayor's office, Fondo de Prevenci n y Atenci n de Emergencias de Bogot ®
Publishing date: December 2000 Page n : 37 Review: Risk reduction in Bogot  based

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Type of Organization: Para-statal

Nominating Organization

same as above

Partners

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Type of Organization: Para-statal
Type of Partner Support: Financial Support

Financial Profile

YEARTOTAL BUDGET IN US\$ (*)FOPAE ASSOCIATE (BUDGET %)ASSOCIATE CVP
(BUDGET %)SOURCE OF RESOURCES19987.529.99697%3%BUDGET to
public199911.556.15693%7%BUDGET to public20003.930.408100%0%BUDGET to
public2001629.66592%8%BUDGET to public



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