

Sound Practice No.1

Risk Information System: A decision making tool

Overview

An agreement with the French Institute for Research and Development (IRD) was signed by the Housing and Territory division of the Metropolitan District of Quito (MDQ). The Housing and Territory division of the municipality, which is traditionally called the Planning Direction, has been in charge of setting strategies and plans for the growth and development of the MDQ. The IRD has a wide cooperation agenda around the world and has been working with Ecuador for the past 30 years. They traditionally work in partnership with different local organizations in order to improve capacity, to generate and spread information throughout the different institutions and organizations, and to ensure the continuity of research once the mission has been initiated.

The intended outcome of this project, which began in 1999 by the IRD and MDQ, is a knowledgebase system used to help promote judgments on risk prevention policies, particularly preventive urban planning concepts leading to disaster risk management plans and their implementation. A future process may lead to the relocation or redistribution of vital administrative activities for the retrofitting of strategic buildings, as well as changes in the traffic network in order to facilitate access to critical infrastructure like hospitals, fire stations, and police stations, etc. It is also important to discuss backup plans regarding water, electricity, and communication provision to key sectors. This knowledge will be useful for future land use and planning regulations.

Significant Background Information

This research project's main goal is to provide useful information to the city decision-makers in order to promote preventive policies for urban planning and emergency/crisis management. The Metropolitan District of Quito (MDQ), which is the capital city of Ecuador, can be subjected to rather frequent and diverse natural hazards. The risk associated to these events are intensified by the exposure of a vulnerable buildings, infrastructure, and groups of particularly poor and informal settlements located on already dangerous sites, which are prone to floods and landslides. In addition, the environmental degradation has substantially increased the city's vulnerable condition, not to mention the transport and storages of gasoline and other inflammable products in the city.

Due to scarce economic resources, and given the huge amount of investment needed to protect and upgrade the capital both socially and urbanely, decision

makers will need to make well informed decisions about where to invest first, and how the city can get the most out of the investment made in order to benefit in the most productive manor. To propose a solution to this dilemma, the French Institute for Research and Development and The Metropolitan District of Quito has started the investigation program "Risk Information System" in 1999. The purpose of the project is to promote scientific knowledge about the risks, and, also, give concrete elements for diminishing the vulnerability of the city. The project has four specific objectives:

- To increase risk and vulnerability knowledge in the city of Quito
- To create a method of analysis for risk in urban areas
- To implement a tool to support decision making in risk management
- To try to link investigation and application of concepts in risk management in urban areas.

To create an effective prevention risk policy it is essential to consider, first, the elements and spaces that are the most important and vulnerable. The first phase of this project is searching for those strategic sites and specific elements that become critical for the proper functioning of the city. The results of this phase were published in the first book the "Most essential places within the MDQ" in December 2002. The most important elements of the city were identified, localized, and classified.

The following phase of the project deals with the analysis of impact of the scenario. This phase deals with identifying critical elements of the system that would stop working due to severe damage, and how and where should resources be allocated in order to reduce their vulnerability. This analysis is described in the "Vulnerability of The Metropolitan District of Quito", which was published in 2004. The phase covered in this document focuses on the essential elements and allows to take into account all the dimensions of the vulnerability without being limited by the characteristics and locations of certain risks.

Sound Practice Details

The general philosophy of this program is based on a simple concept, which is in order to implement an efficient management risk policy it is first necessary to identify the most important elements of the system, then the elements that could suffer from natural catastrophes, and finally those that are vulnerable. Therefore, it is fundamental to start by determining the essential elements of the system by taking into consideration their position and spatial location. In the first book, the "Most Essential places within the MDQ," the most important elements of the city of Quito are identified along with their geographic positioning and the analysis of their location. Three areas were considered essential for the existence and the functioning of the city:

- The population and its' needs: population and basic services distribution such as schools, hospitals, historical buildings, culture, etc.
- Urban logistic: water and sewage system, telecommunications, electric network, gas pipes and pipelines, etc.
- Economy and Administration: location of factories, administrative offices, and cost of land.

All the information gathered during this investigation was validated, geographically localized, and integrated in the data base of the Metropolitan Studies Unit. This data was treated and processed with the Geographic Information System Savane to obtain a cartographic representation of the essential places of the MDQ.

In the second phase of this project the different vulnerabilities were identified and published in "Vulnerability of the Metropolitan District of Quito." The underlying principle was to solve the problem as expressed as follows: it is possible to reduce the overall vulnerability of the MDQ by reducing the vulnerability of those essential elements and places at risk. The city could seek, for example, some investments in order to reduce disruption of water, electricity, communications, or food provision, or could consider a process of redistribution for all of the vital economic and administrative activities that are vital to the city. By knowing where the essential elements are located and what kind of exposure they face, the city can consider actions like relocation, retrofitting, among others. The methodology used to determine the territorial vulnerability of the MDQ is based on the conjugation of four dimensions that can increase or reduce the vulnerability of the territory. These four dimensions are: the essential elements, the spatial vulnerability, the vulnerability of the essential elements, and the reduction of the vulnerability. The different places were classified by type and degree of vulnerability that they create. The classification allows prioritizing and focusing the actions and measures for risk reduction.

The methodology previously described was applied on a third study, which was described in "Mobility, Essential Elements and Risks in the MDQ," published in 2005. In this study the risks and vulnerabilities of the MDQ are described and the focus is on human mobility and accessibility. First, the human mobility and the transportation system were studied. Secondly, the most important infrastructures related to the mobility are identified and localized, and, finally, the vulnerability factor was analysed. The objective of this study was to evaluate the risks that the city is confronted with by taking into consideration the actual mobility problems, the ability to give substantial ideas, and solutions to diminish vulnerability and risks.

Innovation and potential for replication

This practice's innovativeness relates to the basic concept stated earlier. The starting point is that the city rather than the hazards, i.e. giving more importance to the essential elements that keep the city running and, subsequently, the hazards are taken into account only as an additional input for the city's behaviour. For instance, if an earthquake damages the administrative infrastructure of the city, the water supply, or the electricity system, etc. In this way, risk management could more easily be integrated into decision making processes by administrators and local authorities. The notion of essential elements has been used in France but the subsequent philosophy and the methodology itself has been further developed in this project.

This methodology is thought to be replicable in other big cities of the region, and it could actually be applied in a simpler manner than what was done in Quito. Even though, the available information and the use of a GIS system were highly relevant regarding the purpose of this project. Every opportunity to review and update the system should be taken. One of the most serious problems with this practice has been the data collection process. In the case of the project in Quito, the whole process has taken almost seven years. Since the information is generated by different organizations and institutions there are no clear mechanisms for a fast exchange process. Also, the quality of the information could not be verified due to the lack of supporting documents, standardization, and periodical updating.

Monitoring and documentation

Since this is the research phase of the project, the set indicators deal with periodic reports, papers, and publications. Presentations and partial reports during local workshops and seminars reflect the importance that has been given to establishing protocols and mechanisms in order to keep municipal actors informed and involved in this process. The methodology currently being used considers a thematic process, so each subject was looked upon independently and a report including maps, figures, and data analysis was produced for each. Databases were integrated to the city's information system.

A cooperation agreement has been signed between the IRD (French Cooperation) and the Municipal District of Quito to ensure a municipal support on this research program. Human resources are being trained and empowered regarding the knowledge of the specific methodology and the city vulnerability so they can provide continuity to the project.

Several articles have been published during national and international workshop proceedings, and three books were published: The "Most Essential Places within the MDQ" (R. D'Ercole, P. Metzger, 2002), " Vulnerability of the Metropolitan District of Quito" (R. D'Ercole, P. Metzger, 2004) and "Mobility, Essential

Elements and Risks in the MDQ” (F. Demoraes, 2005).

Knowledge Base Coding Reference

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