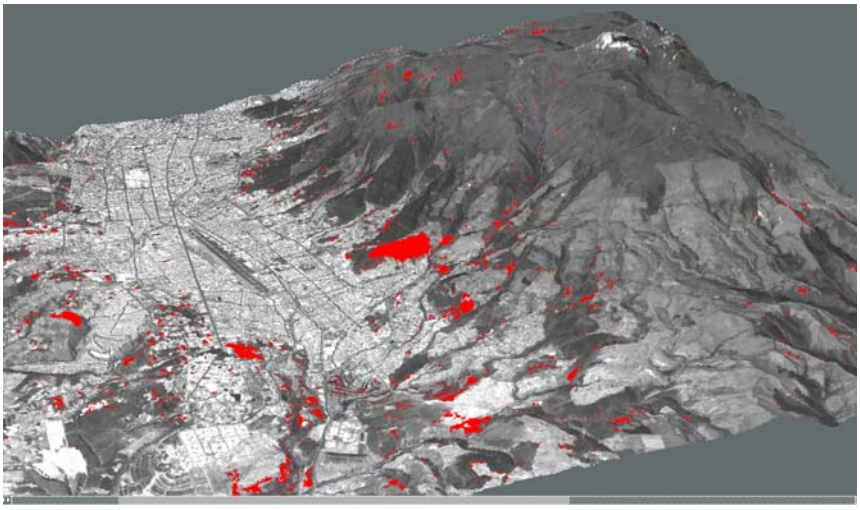
Sound Practice No.2

Flooding and Landslide Risk Reduction in Quito[1]



THE PICHINCHA SLOPES IN QUITO

Background

Latin America is one of the most urbanized regions in the world and most of its cities lack effective urban planning. Continued migration to cities, budget shortages, and trends toward Government decentralization adds pressures on municipalities in dealing with urban management and provision of services. The impact on the environment of these cities has been an area of growing interest among policymakers, researchers, and the community.

Quito, the capital city of Ecuador, reflects this trend. From 1950 to 1990, Quito grew six times in population and twenty times in area, especially in the 1970s due to changes in rural agriculture and new job opportunities in the petroleum industry Moreover; many were drawn to this capital city by tightly-knit social networks. During those years, the population in the city grew at annual rates

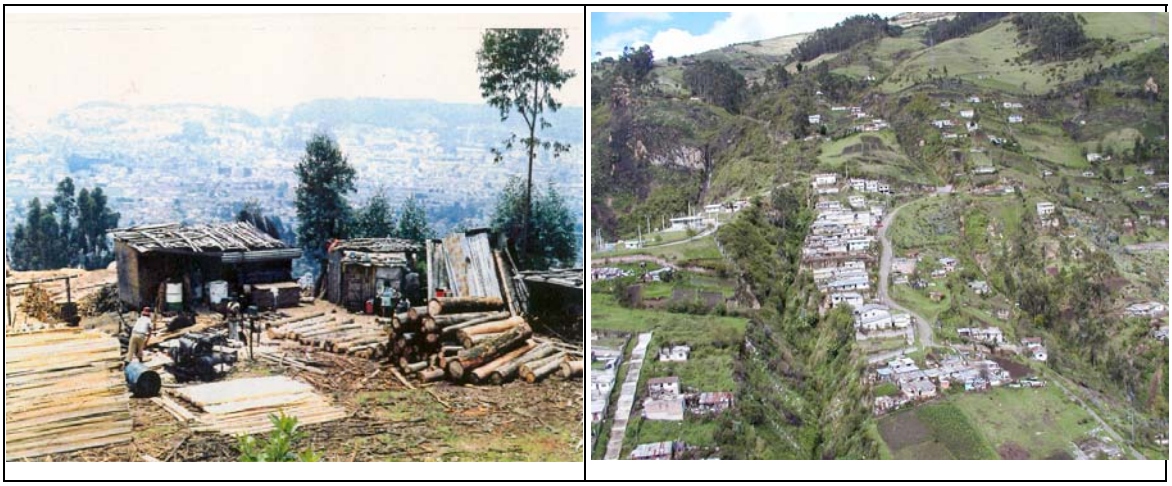
[1] This practice was written by J. Fernandez, 3cd Program - Component 1 Coordinator, based on publications on the project provided by Mr. Othon Zevallos, project manager.

between 1.3% and 3.4%.

Because of this rapid urbanization and a limited housing supply, Quito's working class residents and migrants were forced in the late 1970s and early 1980s to settle on lands on the periphery of Quito and mainly on the steep slopes of Mt. Pichincha, which bounds the city to the west.

Many residents formed housing cooperatives and purchased property from land speculators. Sometimes, they invaded agricultural lands surrounding the city and forced the owners to sell.

Most of these neighbourhoods were declared illegal and they could barely get basic services. In other cases, they occupied the high and steep slopes of the mountains around the city, where provision of water, for example, was impossible. The forest has been progressively destroyed, leading to environmental degradation that has triggered successive natural disasters associated with landslides and flooding.



ENVIRONMENTAL DEGRADATION AT THE PICHINCHA SLOPES

This sector located on a steep Andean slope is at risk from several types of natural disasters. A study on seismic risk in Quito found that these neighbourhoods are at "high" or "very high" risk of landslides and damage to construction due to seismic activity. Torrential rain also causes problems in this sector during the rainy season; a problem compounded by the fact that approximately 44% of housing units are still under construction and the natural

drainage system is often obstructed by garbage thrown in the ravines (Peltre, 1989; Metzger and Bermúdez, 1996).

Solid waste is another major problem in the area, as about one quarter of the residents either burn their garbage or throw it in vacant lots or ravines, also important ravines have been filled in order to give continuity to the urbanization process. These actions substantially affect the natural drainage system.

In 1995, official data showed that some 55,000 lived in the slopes, but more realistic information shows a population of 75000, living in 15000 non-engineered houses, distributed in 22 neighbourhoods; of these, 8 have been there for the last 20 to 30 years, and the rest, the last 10 years, a proportion which has certainly risen as growth rates in these neighbourhoods are higher than in other parts of the city.

Again in the 90s, the estimated population living in informal settlements around the city, not only on the Pichincha slopes, was estimated on some 200,000, corresponding to the 18% of the population at that time. Now a day, this indicator has substantially increased due to the severe economic crises that affected the country in the recent years.

Reducing the risk

Despite information provided regarding risk, residents do not identify natural hazards as a priority problem, a survey carried out by CIUDAD, an NGO dealing with urban problems in Ecuador, concluded that more than 80% said that landslides and flooding are not the cause of severe problems in their neighborhoods as compared to every day problems. The fact that the poor tend to identify everyday problems as the most important issues corresponds with research in other developing countries (Douglass and Zoghlin, 1994; Jacobi, 1994). The lack of community organization was cited among priority problems, along with youth delinquency and domestic violence.

The main purpose of this project is to reduce the risk associated with landslides and flooding in the slopes that surround the city, where informal settlements are producing environmental degradation through deforestation, filling the natural drainage with solid wastes, using dangerous steep areas for construction and

introducing a tremendous vulnerability by building their homes with poor quality materials and non engineered designs which has lead in the past to disasters where lost of life and property has been the characteristic.

In 1997 the municipality of the QDM, through the Municipal Enterprise in charge of Water and Sewage, started a project which main purpose was to mitigate the disaster risk generated in 33 ravines in the northern slopes of the Pichincha Volcano. A $ 25,000,000 million loan provided by the IADB was used in two main aspects: the first one included the design and construction of physical infrastructure to control and regulate heavy mud flows, retrofitting of all the collectors, provision of a hydrometeorological monitoring system and escorrentia control. The second one had to do with actions related to improving the capacity of the community, solid waste management, urban planning and municipal structure strengthening.

Objectives accomplished

The first phase of the project ended in year 2002, it included, among other major infrastructures, the construction of 10 earth dams, 2 RC dams, 7 lateral reservoirs, 14 retention ponds before water goes into the collectors and several other mechanisms for energy dissipation. The instrumentation included 25 pluviometer stations, 8 climatological, 6 hydrometric, 10 limnimetric, 1 base station, etc. Finally, a master plan for managing environmental and protected areas, was implemented, as well as a Comisaria to control illegal occupation was put in place, along with community capacity building.

Lessons learned

The infrastructure provided showed to be effective during the heavy rainy season of year 2000, landslides and flooding in the lower parts of the city were completely controlled in the north-western slopes of the city, at the same time, a contingency plan was run with an already trained community which showed to be very successful. Since de Laderas Project was fully put in place, the city has not registered disasters originated at the Pichincha slopes, in addition the cost of operation and maintenance of the sewerage system in the lower parts of the city has been notably reduced.

A multidisciplinary approach that involved the municipality and its Enterprises like EMASEO (solid waste) and EMOP (public works) and EMAAP (Water), the Civil Defense, organized community groups, and NGOs proved to be adequate to gain people active participation and gain experience to deal with this problematic at the institutional level.

Follow up

A new project to work in a new front of the Pichincha Slopes, this time moving closer to the downtown area or old city area, will deal with a methodology for flooding control and slopes management, as well as control of landslides, mud and water flooding in the Historic Center of the city. This will include recovering and upgrading old ravines. The cost of this new project is $50 million.

Knowledge Base Coding Reference:

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