Comprehensive Risk Mitigation in Manizales (with special reference to seismic effects)

The city of Manizales has always been exposed to natural and man-made hazards. Its towering slopes have exacted a heavy toll in lives and property. Thus it was that the earthquakes of 1979 and 1983 and the eruption of Mt. Ruiz in 1985, among other misfortunes, led the Government to encourage local and regional prevention programmes through the National Office for Risk Mitigation and Disaster Preparedness.

Initially, the Manizales Mayor's office assigned FICDUCAL (a body that coordinates programmes among the five universities) the task of drawing up a project that would define technical and scientific research and institutional arrangements for preventing and coping with disasters.

The commission appointed for the purpose produced a document entitled «Integrated Management of Emergency Prevention and Relief Activities in Manizales», which it submitted in November 1988. The initiative was later followed up with the creation (in 1990) of a Technical Committee, consisting of representatives of the Town Planning Office, the University of Caldas, the National University, CORPOCALDAS and INGEOMINAS, responsible for carrying out the programme drawn up in 1988.

Initially, ONAD (today DNPAD) included the Manizales project in its appeals to UNDRO and UNDP for international assistance, also entering into discussions with the French Bureau of Geological and Mining Research (BRGM) which had provided tech-

PANORAMIC VIEW OF THE MANIZALES CITY

nical and scientific advice to the Seismic Microzonation Project in Popayán.

As a result, DHA-UNDRO agreed to the inclusion of Manizales as the second topic under phase II of the Risk Mitigation Programme in Colombia, to encourage comprehensive planning for disaster mitigation with special reference to the consequences of an earthquake in the city. Such planning is coordinated locally by the Director of the Comprehensive Plan for Emergency Response in Manizales (PADEM) at the Mayor's office.

Matters considered in the development of the project:

- Geological and geotechnical zonation of the city and its expansion zones in order to evaluate likely disaster scenarios arising out of earthquakes;
- Assessment of the structural vulnerability of typical constructions;
- Assessment of the city's vulnerability to fire;
- Preparations to care for and protect the general public in the light of the risk scenarios.

1. Geological and geotechnical zonation of the city and its expansion zones in order to evaluate likely disaster scenarios arising out of earthquakes

To analyse seismic-risk-related matters, two subprojects were established: they were concerned with geology within the project overall, seeking to determine the origin, distribution and physical location of the surface formations on which the city and neighbouring areas are built and evidence of recent tectonic activity (i.e. during the past eight million years) in order to see whether the forces acting over that time were the same as those that are at work today or had changed, and what structures were accumulating energy that might later be released in an earthquake.

An agreement was struck between the City of Manizales and the University of Caldas to pursue the studies below on geological and geotechnical analysis:

SEISMIC MICRO-ZONIFICATION OF MANIZALES