ONE STEP AHEAD OF DISASTERS: MITIGATION AND PREVENTION

DISASTER MITIGATION

Mitigation measures can bring the physical, social, and economic effects of disaster down to manageable levels thereby contributing to long-term development Although measures to mitigate the effects of natural disasters may seem costly, they represent only a small fraction of the total cost if built into the initial design

On the morning of 19 September 1985, Mexico City was struck by what was considered its most destructive earthquake of the century; strong aftershocks followed. Looking at photographs and other documents of the earthquake's effects on buildings and vital public services, people asked themselves: How could modern buildings, designed in accordance with a strict code, collapse and kill so many people? (see Table 6.1). Three answers were found: first, the characteristics of the soil in the city, especially downtown, allowed for an amplification of seismic waves; second, there was an underestimation of the design parameters for torsion in asymmetrical buildings, and third, there were probable flaws in construction practices

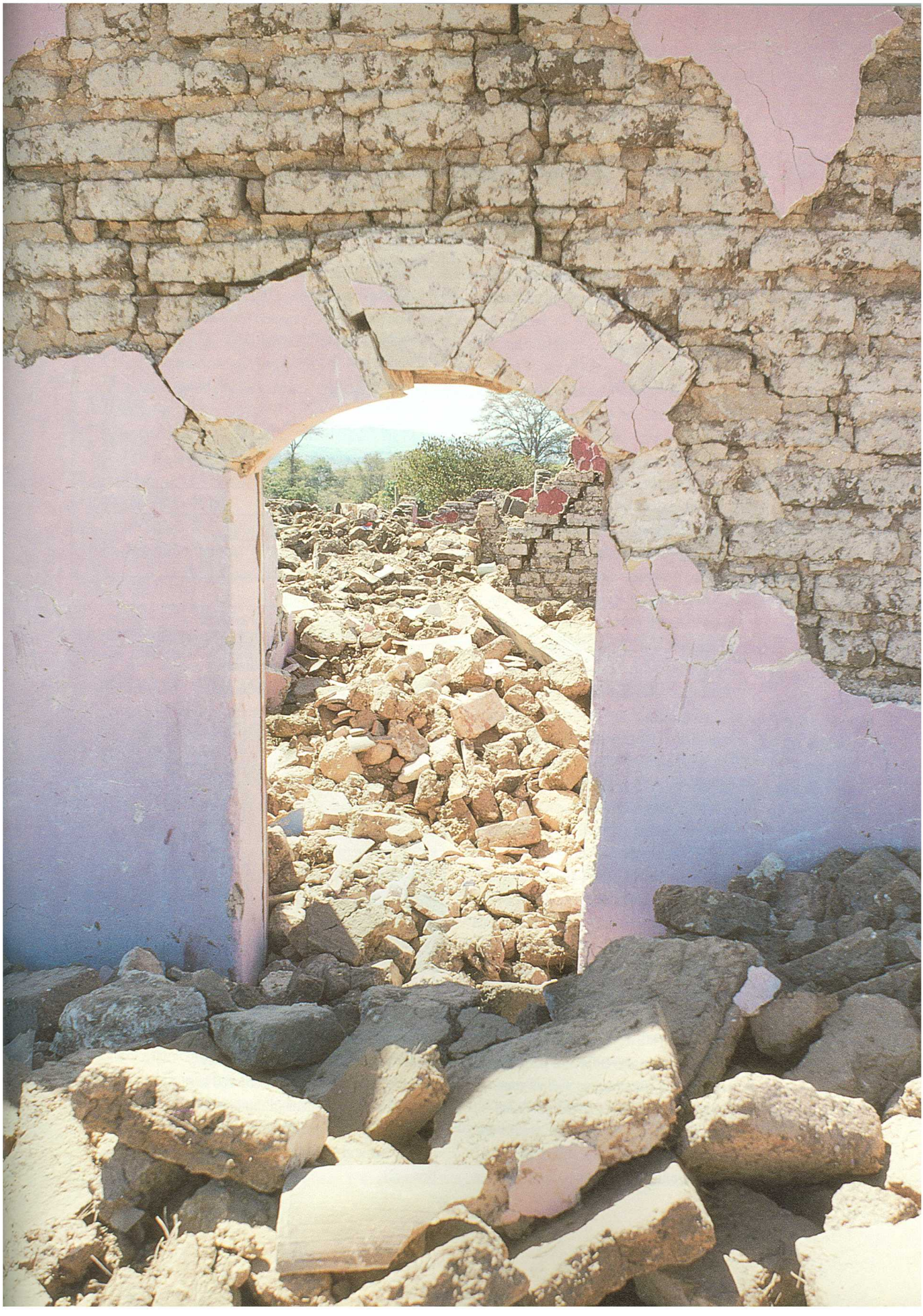
From the perspective of science, the riddle was solved, but for the health sector, the event was a tragedy that meant attending to the survivors, recovering bodies, and monitoring the city's water supply. The spectacular collapse of the Juárez Hospital made headlines all over the world and took the lives of patients, visitors, and health workers, even though it was a relatively modern building and, even more serious, had an emergency plan.

The destruction of this hospital, combined with the collapse of the Obstetrics Tower of the General Hospital and the severe damage to other hospitals, put at least 5.000 hospital beds out of service when they were most needed. The use of these beds was not restored for two years. The destruction prompted another question: Are emergency plans for hospitals and essential services enough if there is no guarantee of how the structures that house these services will perform?

Photo de Ville de Goyet PAHO/WHO

The response, a logical one after the tragedy occurred, set the stage in Mexico for a process in which most Latin American and Caribbean countries are currently engaged: disaster mitigation. At the end of the 1980s the concepts of prevention and mitigation began to consolidate as a basic element of disaster management.

To mitigate natural disasters means to act before a disaster occurs to minimize the human and material losses it causes. Mitigation would not be of such concern today if the colonizers of Latin America and the Caribbean had been familiar with the region and built their towns in the least dangerous rather than in the most attractive and advantageous sites. Some time later they discovered, at a high price in terms of human lives and ruined



infrastructure, that many of these areas and buildings were prone to destruction by frequent volcanic eruptions, earthquakes, floods or hurricanes. The city of Antigua in Guatemala, which has been struck several times by earthquakes since colonial times is an example of this lack of foresight due to ignorance. In the aftermath, the authorities resorted to safety regulations—limiting the height of buildings, planning land use, and designing broader plazas and streets—to lessen damage from subsequent events. Without so stating, they sought to mitigate the effects of disasters.

Population growth has led to the proliferation of human settlements in areas that are prone to natural hazards. In this context, programs aimed at disaster mitigation are becoming a fundamental element in development planning. In view of this irreversible trend, the UN declared the 1990s as the International Decade for Natural Disaster Reduction (see Box 6.1).

Two questions are in order: 1) Are mitigation and prevention valid in a cost-benefit analysis of the investment 2) Can countries afford to lose human lives and multimillion dollar investments in infrastructure and services in the event of disasters because they failed to invest in mitigation measures during the planning, design, and execution of the projects?

No reliable studies have been done that justify, in cost-benefit terms, more investment in disaster mitigation or prevention. Organizations such as the Economic Commission for Latin America and the Caribbean (ECLAC), the World Bank, the Inter-American Development Bank (IDB), and other institutions, as well as some insurance companies, are developing such studies, but no definitive results are yet available. One of the strategies of the International Decade for Natural Disaster Reduction is precisely to involve such institutions in demonstrating the medium- and long-term economic profitability of investments in disaster mitigation and prevention as part of each country's planning and sustainable development.

The effects of disasters, in terms of social and economic losses, should alert governments and agencies to the need for mitigating disaster impact instead of simply preparing to react. However, nationwide mitigation programs, in the form of medium- and long-term projects, do not yield visible results for political leaders. The same reasoning applies to financial analysis: investing in disaster mitigation where the probability of a significant natural event seems remote is not considered profitable. Mitigation measures are even overlooked in the design of infrastructure, since they are considered to make the initial investment unnecessarily more expensive. Changing these patterns of thinking and behavior takes time (see Box 6.2).

Table 6.1

Number and type of damaged buildings, Mexico City, 1985.

Category	No.	%
Public offices	765	11.5
Schools	1,657	24.9
Hospitals and health centers	892	13.3
Cinemas and theaters	76	1.1
Private buildings	1,133	17.1
Sports centers	11	0.2
Pedestrian overpasses	1	—
Markets	1,785	26 9
Roads	310	4.7
TOTAL	6,630	100.0

Source Metropolitan Emergency Commission, Mexico

DISASTER PREVENTION

Disaster prevention includes activities designed to provide permanent protection from disasters by controlling the effects of natural phenomena. Depending on technical feasibility and cost/benefit considerations, investing in preventive measures is justified in areas frequently affected by disasters

Source UN/DHA and PAHO

Box 6.1

GOALS OF THE IDNDR

The main goal of the International Decade for Natural Disaster Reduction is that by the year 2000 all countries should include the following three items in their plans for sustainable development

- National evaluations of vulnerability and of the risks posed by natural hazards,
- Medium and long-term mitigation and prevention plans, at the national and local level, including preparedness and community awareness campaigns;
- Access to world-wide, regional, national, and local warning systems, in addition to the widespread broadcasting of warnings.

Advances have been made in Latin America and the Caribbean toward attaining these goals; many began before the proclamation of the Decade However, the Decade is a starting point for developing new concepts and organizations dedicated to disaster management. It also provides an opportunity for horizontal cooperation between neighboring countries and the exchange of positive experiences

At the regional level, the Regional Office of the IDNDR Secretariat, PAHO/WHO, the OAS and La RED, among others, have been the principal agencies in charge of promoting the goals of the IDNDR

Source IDNDR Regional Office

Box 6.2

DISASTER MITIGATION IN HOSPITALS: AN IDNDR DEMONSTRATION PROJECT

Photo: Vizcarra, PAHO/WHO

A hospital is an essential building. Not only does it represent a major investment because of the sophisticated equipment it houses, but its role in the community is very important, especially during emergencies At critical times, such as after a natural disaster, the demand for its services is most important.

However, an estimated 50% of the 13,000 hospitals in Latin America and the Caribbean are located in areas at risk due to natural hazards, and more than half of them lack disaster preparedness or mitigation plans

Early on in the Decade, PAHO/WHO began a project aimed at engineers, architects, and persons in charge of hospital maintenance, as well as political and administrative decision makers to show the need for investing in the protection, maintenance, and reinforcement of existing buildings This is in addition to creating awareness of the responsibility to design and construct new buildings with specific safety criteria that take into account the effects of natural disasters As a part of the initiative, PAHO developed guidelines and pilot projects and has supported vulnerability analyses in hospitals in Chile, Saint Lucia, and Venezuela

This initiative has been welcomed by several countries, many of which are implementing corrective measures. As always, the main obstacle to the success of these projects will be budgetary limitations

Source PAHO/WHO

Box 6.3

INSURANCE POLICIES IN THE CARIBBEAN... UNFORESEEN MITIGATION

As a result of the damage to the Caribbean islands caused by Hurricanes Hugo, Gilbert, and especially in 1992 by Andrew which also lashed the coast of the United States, reinsurance companies were not willing to continue covering such heavy and frequent economic losses. The possibility of eliminating reinsurance for natural events was even discussed. Local insurance companies then decided to double and even triple premiums, whereupon insurance became unaffordable for the private sector Rates usually depend on the proximity of a building to the coastline and the quality of construction materials used

Some businesses decided to forego the peace of mind afforded by insurance policies and to conduct cost-benefit studies of probable losses versus the cost of reinforcing or upgrading buildings Not surprisingly, these studies demonstrated that it is more profitable to reinforce buildings and systems, even if it requires major investment, than to pay for the repair of frequent damage. In other words, it is more economical to mitigate the effects of hurricanes than to cope with the losses

There is little incentive—in the form of preferential premiums—for those who take measures to prevent wind damage to their property After disasters, premiums are increased indiscriminately for all buildings, regardless of their degree of vulnerability.

Source OAS, PAHO

Some measures, such as reinforcing existing structures, seem too expensive for the limited budgets of many countries. Others, such as land-use regulations in at-risk areas, depend not only on legal backing but also on the ability to monitor enforcement. For these reasons some financial institutions and cooperation agencies are reluctant to provide funds for disaster mitigation programs. They prefer to support the relief and rehabilitation phases because of their greater visibility.

In some countries that have achieved progress in disaster mitigation, insurance agencies are becoming indirect promoters of improved construction designs or of retrofitting existing buildings. Economic incentives, in the form of preferential premiums, may be given for buildings that are well-protected and that comply with safety regulations (see Box 6.3).

Many mitigation projects have been completed in the countries of Latin America and the Caribbean, frequently with the financial and technical support of international agencies and institutions. These projects are in three basic areas: studying risks, reducing vulnerability, and training. For mitigation projects to work, an organized national system for disaster management must exist to support and lend continuity to a project. Ideally, a system with multidisciplinary and multisectoral representation and with legal and political backing is best suited to mitigation programs.

DISASTER MITIGATION: MAPS AND SCENARIOS FOR PLANNING

The information displayed on a map, with its striking colors and easy-to-interpret data, is a powerful tool for teaching about natural hazards. A map can summarize the findings of detailed scientific research and present it in a way that nonspecialists can understand. For this reason, most disaster mitigation projects include an initial phase in which maps of different degrees of complexity are prepared to establish restrictions on land