Handbook

for Estimating the Socio-economic and Environmental Effects of **Disasters**

Economic Commission for Latin America and the Caribbean
E C L A C

ORIGINAL: SPANISH

The reproduced document in this publication is:

Economic Commission for Latin America and the Caribbean (ECLAC) 2003.

Handbook for Estimating the Socio-economic
and Environmental Effects of Disasters
LC/MEX/G.5
LC/L.1874

C O N T E N T S

Introduction

I. BACKGROUND

Disasters have a major impact on the living conditions, economic performance and environmental assets and services of affected countries or regions. Consequences may be long term and may even irreversibly affect economic and social structures and the environment. In industrialized countries, disasters cause massive damage to the large stock of accumulated capital while losses of human life are limited thanks, among other factors, to the availability of effective early warning and evacuation systems, as well as better urban planning and the application of strict building codes and standards. In developing countries, on the other hand, fatalities are usually higher owing to the lack or inadequacy of forecast and evacuation programmes. Although capital losses might be smaller in absolute terms when compared to those in developed countries, their relative weight and overall impact tend to be very significant, even affecting sustainability.[1]

Whether disasters are essentially natural or man-made in origin, their consequences derive from a combination of human action and interaction with nature's cycles or systems. Disasters occur frequently around the world, and their incidence and intensity seem to be increasing in recent years. They can lead to widespread loss of life, directly and indirectly (primarily or secondarily) affect large segments of the population and cause significant environmental damage and large-scale economic and social harm.

In fact, recent ECLAC estimates show that in the last three decades more than 150 million people have been affected by disasters in Latin America and the Caribbean, including more than 12 million direct victims and 108,000 deaths. Moreover, total damage –and this was not an exhaustive estimate for the whole region– amounted to more than 50,000 million 1998 dollars, concentrated in the smallest and relatively less developed countries, especially in Central America, the Caribbean and the Andean sub-regions.[2] (See Figure 1 below).

Globally, statistics show that disasters cause more socially significant and irreversible damage in developing countries, where the poorest and most vulnerable population groups feel the most severe impact. In the developed world, on the other hand, an increasing and significant degree of protection against disasters has been achieved over the years thanks to the availability of resources and technology for the introduction of effective prevention, mitigation and planning measures, together with vulnerability reduction schemes. Even in these countries however, damages have risen significantly as a result of the greater concentration and value of societal activities.

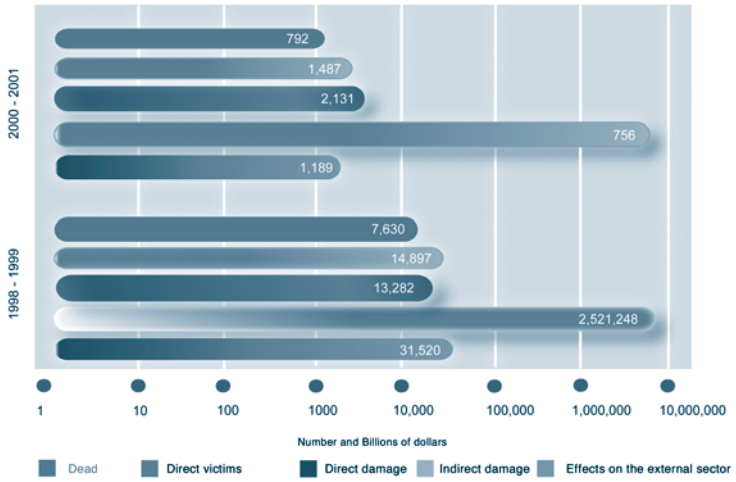
---

1 Jovel, Roberto, "Natural Disasters and Their Economic and Social Impact", *ECLAC Review*, No. 38, Santiago, Chile, August 1989.

2 See ECLAC and IDB, *Un tema de desarrollo: La reducción de la vulnerabilidad frente a los desastres*, Mexico City and Washington, 2000.

Some progress has been achieved in the field of planning, prevention and mitigation in Latin America and the Caribbean, but large segments of the population still live in highly precarious and vulnerable conditions. Most of the countries in the region are in areas that are prone to hydro-meteorological and geological phenomena that have produced well-known instances of widespread loss of human life and significant damage to physical and social infrastructure, while undermining economic performance and the environment.

Figure 1
LATIN AMERICA AND THE CARIBBEAN; EFFECTS OF DISASTERS (1998-2001)



Undesirable disaster effects may include damage to economic and social infrastructure, environmental modifications, fiscal and foreign sector imbalances, price increases, modifications to demographic structures and changes in development priorities as the task of replacing lost or damaged assets results in the deferment of projects intended to overcome long-standing needs. The most devastating impact is undoubtedly the deterioration in the social well-being of the population, especially among the poorest and most vulnerable population groups. Furthermore, the ramifications of disasters increasingly extend beyond the affected community or country through unexpected population migration, disease transmission, trade reductions or widespread environmental modifications.

To reduce the long-term effects of disasters, affected countries must take actions along parallel tracks. First, as an integral part of their economic and social development strategy, they should assign financial resources for the prevention and mitigation of the foreseeable impact of a disaster. Such a commitment should be understood as a high-yield investment –in economic, social and political terms– for achieving long-term growth. Second, once a disaster has occurred, they must ensure that reconstruction investments contemplate vulnerability-reduction features to favor an adequate level of sustainable growth.

When a disaster occurs, national-emergency bodies are generally in charge of assessing humanitarian needs during the emergency stage, with support from the United Nations System and other public and private international organizations. It is now standard practice for the affected community or country to take the most essential steps to meet humanitarian requirements arising from the emergency. In addition, friendly countries and international organizations either directly or through non-governmental organizations. Promptly provide additional assistance as needed, both public and private agents take part in this effort, along with many local, regional and international non-governmental or social assistance organizations.

Reconstruction of damaged or destroyed assets, however, normally requires resources well beyond those available during the emergency or humanitarian assistance stage or otherwise within reach of the affected country. As a result, reconstruction is often undertaken without vulnerability reduction. To put it bluntly, vulnerability is reconstructed instead of being reduced.

To avoid this, immediately after the emergency stage, an assessment must be made of the direct and indirect effects of the event and their consequences on the social well-being and economic performance of the affected country or area. This assessment need not entail the utmost quantitative precision, but it must be comprehensive in that it covers the complete range of effects and their cross-implications for economic and social sectors, physical infrastructure and environmental assets. With such estimates in hand, it is possible to determine the extent of reconstruction requirements, which is an, urgent task since those affected cannot wait long under the conditions prevailing after a disaster occurs. Such an exercise is indispensable for identifying and undertaking reconstruction programme and projects, many of which will require the international community's financial and technical cooperation.

To ensure vulnerability reduction, reconstruction programme and projects must be designed within a mitigation and prevention strategy that is part of the development process. Therefore, a set of diagnostic tools is needed to measure the type and amount of damage and losses caused by each type of disaster. Such working tools are not very abundant in the economic literature, especially since they must be able to gauge social, economic and environmental effects.

Based on special disaster-assessment endeavors in the region since the early 1970s, the Economic Commission for Latin America and the Caribbean (ECLAC) developed an assessment methodology that further broadened and developed the concepts outlined by UNDRO a decade earlier.[3]

3 ECLAC, *Handbook for the Estimation of the Socio-economic Effects of Natural Disasters*, Santiago, Chile, 1991; UNDRO, *Disaster Prevention and Mitigation: Compendium of Current Knowledge*, Volume 7, "Economic Aspects," United Nations, New York, 1979.

The methodology published by ECLAC at that time made it possible to estimate the effects of natural disasters; it was also applicable to man-made ones, as in the case of certain armed conflicts in Central America. In the original ECLAC Handbook, disaster effects are measured at the sectoral and global levels, thus allowing for an assessment of the reconstruction capacity of the affected country or region and the scope of the necessary international cooperation. The ECLAC methodology pays due consideration to the prevailing insufficiency of reliable quantitative information for the region, the availability of which is even more limited after a disaster. The ECLAC Handbook did not include methods for estimating damage and losses in certain social and economic sectors, to the environment or to specific population groups.

ECLAC now presents a revised and extended version of the Handbook that incorporates the practical experience acquired through the assessment of numerous disasters in the past decade, as well as the development of new and complementary concepts. This new version has also greatly benefited from the cooperation and contributions of distinguished experts and consultants from Latin America, the Caribbean and other parts of the world, and it is the result of the conceptual analyses of many disasters that have occurred in the region over the past three decades.[4]

This revised Handbook incorporates new and significant developments while refining and improving the methodology for damage assessment contained in several sections included in the first version published in 1991. In that respect, special reference should be made to the inclusion of cross-sectoral subject areas such as the environment, employment and income, and the differential effects on women, whose action is essential both during reconstruction and in mitigating the future impact of disasters. Furthermore, we put forward new tools for this type of analysis, which are now available thanks to the databases that can be accessed over the Internet, the use of remote sensors and the systematization of geo-referenced information. The Handbook points to some analytical difficulties associated with lags in the compilation of sufficiently detailed or itemized information –for example by sex, by income group or by geographic or political areas within a country– or the lack of baselines defining "normal" or pre-disaster situations such as environmental situation diagnoses and human development and social fabric indicators.