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The Impacts of Natural Disasters on Developing Economies: Implications for the International Development and Disaster Community

Romulo Caballeros Otero and Ricardo Zapata Martí

Natural disasters have numerous impacts on national economies that can bear on the conduct of economic policy, on the sustainability of long-term development strategies, and on productive performance. These impacts are particularly relevant in the countries of Latin America and the Caribbean, which frequently experience natural disasters of various origin and intensity, with the sequel of human lives lost and grave economic and social impact.

During the past three decades, the frequency and severity of disasters and adverse natural cycles have been compounded by the emergence of new, quasi-natural and unpredictable events. A nation's or a society's capacity to respond to and face these unscheduled happenings and the nature of the actions necessary to do so are in an important measure affected by the ability to measure, appraise, and evaluate the damages caused.

The complex matrix of such events comprises both natural disasters, such as earthquakes, tsunamis, hurricanes, floods, volcanic eruptions, and plagues, and relatively new phenomena that can be man-made or induced by human conduct, such as ecological disasters, desertification, mega-accidents, urban disasters, or civil wars. Their impact can be seen in the loss, first, of human capital and, second, of productive capital. In the vast majority of cases, emergency actions tend to alter the conduct of current policies, and the reconstruction efforts tend to induce serious changes in economic policies in the medium term. In some cases, effects impinge on national priorities and lead to modifications of development policy that are felt in the longer term and cause irre-

versible adverse effects. Furthermore, depending on its economic position prior to the disaster, a country may find itself unable to undertake the required program and projects for rehabilitation and reconstruction and may require international cooperation—both technical and financial—to implement them.

Some intrinsic elements of the nation, society, or economy affected have, in general, implications for the efforts needed to face the emergency, undertake the reconstruction, and, finally, surmount the consequences of the disaster. Relative size of the economy affected, the magnitude and depth of the event, and the economic and sociopolitical conditions of the country at the time are some of these elements. Given the persistence and growing diversity of these phenomena and the magnitude of their socioeconomic consequences, it is natural for the international community to give more attention and support to the development of means to prevent or, at least, mitigate their more severe negative effects.

The international community—via multilateral lending and technical cooperation organizations as well as bilateral assistance programs of donor countries—is willing to support these undertakings and requires detailed and reliable information concerning the magnitude of the damages. Potential donors expect a precise determination of the most affected sectors and areas, identification of the post-emergency projects and plans that require financial and technical cooperation, and determination of the country's capacity to handle its share of the burden in the rehabilitation and reconstruction efforts. Most recently, at the twenty-fifth session of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) member countries approved a resolution requesting systematic research and analysis of the economic effects of disasters in countries in the region as well as of possible undertakings to prevent and mitigate disasters and reduce their effects (Cartagena de Indias, Colombia, April 20–27, 1994; the text of this resolution is presented in appendix 2-1).

This chapter provides some elements that may help to prevent, mitigate, and reduce the effects of disasters by synthesizing experiences accumulated in the last twenty years through observing and appraising natural disasters in Latin America. It does not make exhaustive reference to the events themselves but rather highlights the immediate, medium, and long-term effects and actions to be undertaken. Since 1972, ECLAC has been assisting member states to assess damages caused by natural disasters. A damage assessment methodology has been developed and tested to estimate the extent of the damages, their economic impacts, and the requirements for rehabilitation and reconstruction, based on the country's capacity to execute programs after a disaster occurs (see ECLAC 1991). The ECLAC methodology facilitates the systematic definition of the requirements for international cooperation in a period of time that does not exceed one to two months; it requires information that can be collected in the days immediately after the disaster strikes and that can be compared to macroeconomic data and forecasts available before the disaster. The methodology is applied to estimate the economic impact of the events rather than to appraise effects of a different nature, such as social short- or long-term impact or ecological and environmental damages.

The first part of the chapter offers general remarks on the typology and salient characteristics of an event, successive phases that take place after it, as well as some methodological insights into dam-

age appraisal. Some conceptual remarks are made on the links between the nature of the country affected, the dimension of the event, and its socioeconomic consequences. From these are derived concepts that will be used in the rest of the chapter as well as some working hypothesis.

The following section presents an analytical description of the components of the methodology for appraising different types of disasters as well as for measuring their effects in the national economy and society. An effort is made to summarize in systematic form the experience of such tasks and to present the implications that disasters may have for a country's institutions, depending on the political or economic situation when the disaster occurred.

This is followed by a synthesis of the different types of consequences that disasters have in the long term, both for development and for economic performance, such as the balance of payments, production, income growth, public finance, and so forth. Special attention is paid to damage control and reconstruction and how they affect they country's national priorities and capability to return to its development path. In this last context, the role of the international donor community and the need for external resources are specifically addressed.

Finally, the last section discusses international efforts needed to prevent disasters. Preventing disasters and reducing their impact must be part of a systematic approach that goes beyond emergency assistance or reconstruction and links development potential and sustainability to these actions.

General considerations

The cycle following a disaster is usually divided into three phases: emergency, rehabilitation and immediate recovery or transition, and reconstruction. The emergency phase refers to the most immediate period after the disaster strikes, when actions to save human lives or to provide first aid are undertaken. It may include actions such as search and rescue, emergency first aid, temporary shelter, provisional restoration of transportation and communication links, emergency repairs to essential utilities and services, and the first efforts to assess the number of persons affected and to estimate damages suffered by public and private property. The rehabilitation or transition phase covers a time frame in which efforts are made to restore the most pressing services and most essential social infrastructure. It includes building temporary shelters as well as repairing transport infrastructure and public utilities and services. The return to normal work, the creation of new jobs, the offering of credit and financial resources, and the initiation of projects to address the immediate consequences of the disaster are among the rehabilitation measures needed to assist the population and communities affected. The reconstruction phase refers to the period required to restore the physical infrastructure and services damaged or destroyed by the disaster.

Types and main characteristics of disasters

Different types of disasters may occur. A broad definition includes dramatic, sudden, unscheduled events that are often accompanied by large losses of human life, suffering and affliction to a society or a significant part of it, and a temporary breakdown of prevailing lifelines and systems. Such events cause considerable material damages and interrupt the normal functioning of an economy and of society in general (other types of natural events, such as droughts, take a long time

to develop into a major disaster and may cause devastating effects in society as well). Disasters so defined can be classified as either natural or man-made.

The most important natural phenomena, according to the frequency of their occurrence worldwide in the last twenty years, are the following: floods, typhoons, hurricanes and cyclones, earthquakes, tornados, whirlwinds and thunderstorms, snowstorms and blizzards, heat waves, cold spells, volcanic eruptions, landslides and landslips, avalanches, tidal waves and tsunamis, and blasting mildew, frost, droughts, sand, or dust storms. The most common man-made disasters are caused by explosions, firestorms, airplane crashes and collisions, movements of the earth or water, and the collapse of dams, embankments, and water reservoirs. A growing list of quasi-natural disasters can be added to these, including processes such as air, water, or land pollution and the reduction and destruction of forests. Also to be considered are social disasters, such as epidemics, famine, riots and pogroms, massacres, terrorist acts, and wars.

Most of the remarks made in this chapter relate to the major natural disasters that have caused the most damage in Latin America and the Caribbean; they have either a meteorological or a geological origin. Tables 2-1 and 2-2 summarize the economic and social effects most commonly associated with natural disasters, grouped by major categories. An especially interesting and devastating natural phenomenon in Latin America is the modification of sea currents and wind patterns that has caused major floods and affected the climate, water quality, and fishing patterns near the Pacific shores of South America. The Latin American and Caribbean region is particularly prone to natural phenomena, especially in the Caribbean, which lies in the path of major tropical storms and hurricanes. The region is also part of the so-called Fire Ring that encompasses the Pacific Ocean and delineates the contact zones of the major tectonic plates where many earthquakes and volcanic eruptions occur (a partial list of the major disasters that have affected Latin America and the Caribbean in the last

Table 2-1: Immediate Economic and Social Effects of Natural Disasters

Type of effect	*Earthquake*	*Cyclone*	*Flood*	*Tsunami*	*Volcanic eruption*	*Fire*	*Drought & famine*
Temporary migration							x
Permanent migration							x
Loss of housing	x	x	x	x	x	x	
Loss of industrial production	x	x	x	x		x	
Loss of commerce	x	x	x	x		x	
Loss of agricultural production (plant crops and harvest)		x	x	x	x	x	x
Damage to infrastructure	x	x	x	x		x	
Disordered markets & distribution	x	x			x		
Interrupted transportation systems	x		x				
Breakdown of communication	x	x	x	x		x	
Panic						x	
Social disruption	x	x				x	

Source: Adapted from Cuny 1983.

Table 2–2: Effects of Natural Disasters on the Earth's Surface, Infrastructure, and Agriculture

Type of disaster	*Effects on the earth's surface*	*Effects on infrastructure*	*Effects on agriculture*
Earthquake	Tremors and fissures	Damage to construction, roads, ditches, and bridges	None
	Landslips	Covered and buried structures; embankments on rivers that cause local flooding	Some local losses to affected area
	Liquefaction of the earth	Damage to buildings that sink	None
	Collapses underground	Damage to underground construction, conduits, and cables; change in the course of underground water	Temporary loss of irrigation
	Avalanches	Damage to buildings, roads,	Local losses of plants and forests ditches, and bridges
Hurricane, typhoon, and cyclone	Strong, gusty winds	Damage to buildings and distribution and high-tension lines	Loss of trees; damage to plants, especially grains
	Flooding (through rainfall)	Damage to bridges and buildings; landslides and landslips	Loss of plants, especially roots and tubers; erosion
	Flooding (through storms)	Damage to bridges, roads, and buildings	Extension damage to plants and irrigation systems; saline deposits: contamination and erosion of earth
Drought	Dryness of earth	No major damage	Destruction of crops and forests
	Wind gusts	Minor damage	Erosion and minor damage to forests
	Desertification	No major damages	Land covered with sand; type and time of crops altered; trees ruined; dry-resistent thorny, bushy vegetation increased
Flood	Erosion	Softening of building's foundations	Destruction of crops; alteration of the type and time of harvest
	Water-saturation and landslides	Buried buildings; damage to other structures	Localized damage to fields of crops and forests
	Sedimentation	No major effects	Improvement in the quality of terrain
Tsunami	Floods	Destruction of or damage to buildings, bridges, irrigation systems, pollution of waters	Localized destruction of crops; saline deposits and destruction of coastal forest and vegetation and water wells
Volcanic eruption	Eruption and deposit of debris on surface	Destroyed, damaged, or buried buildings and other structures; fires	Extensive defoliation, forest damage, and losses near eruption site
		Damage to buildings, ditches, and bridges	Buried crops and destroyed earth and forests; forest fires; temporary damage to earth; pollution

Note: Effects on other productive sectors such as industry and services are mostly reflected in damage to infrastructure.
Source. Adapted from Cuny 1983.