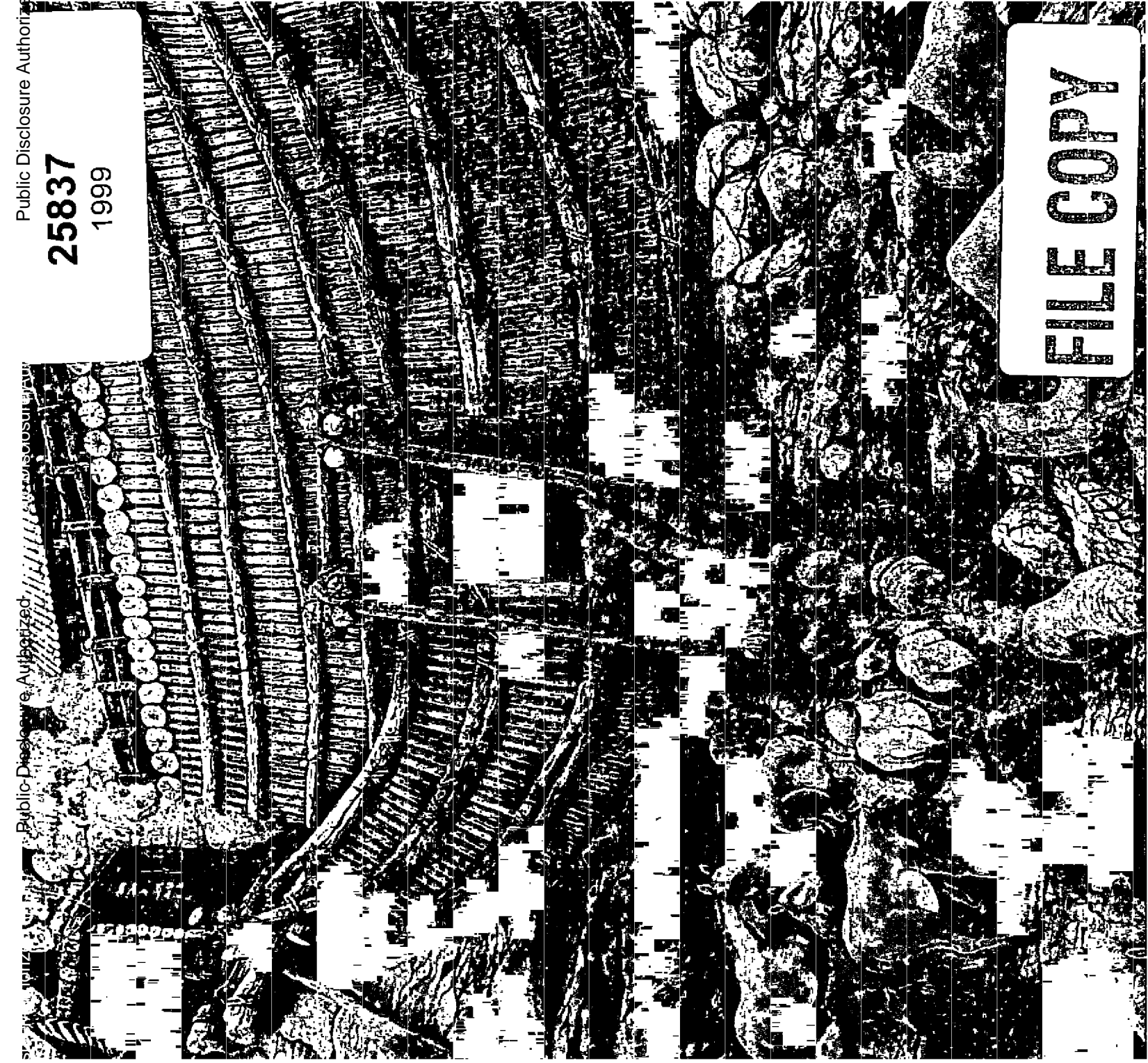


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# INVESTING IN PREVENTION

A SPECIAL REPORT ON DISASTER RISK MANAGEMENT

## DISASTER MANAGEMENT FACILITY

In 1998, the World Bank created the Disaster Management Facility (DMF) to promote projects and initiatives that incorporate prevention and mitigation measures and risk-transfer mechanisms. The DMF manages a project called "Market Incentives for Mitigation Investment" (MIMI), which is exploring possibilities for improving practices and expanding the range of alternatives for mitigation and risk transfer. Teams are being mobilized from the financial, infrastructure and insurance sectors, as well as from reinsurance companies and the research community. Country case studies will be used to examine the potential role of insurance and reinsurance in transferring risk and in helping to reduce losses. With the assistance of local officials and experts, the studies look at current disaster exposure, existing insurance coverage, use of mitigation practices, and the potential for development in insurance and financial markets to mobilize mitigation investments. Studies of ex-ante alternatives are being conducted in several regions and countries, including the Caribbean, Central America, Mexico, Indonesia, Bangladesh and Argentina.



### urban age

*This special report was prepared by the Disaster Management Facility of the World Bank, Washington, DC. Editing, production and design by Urban Age magazine.*

## INTRODUCTION

# PREPARING FOR A SAFER WORLD

**T**here is no denying that human nature draws us to the drama of earthquakes, landslides, cyclones and the like. Big headlines and on-the-scene television news reports generate waves of public and government assistance—along with rushes of interest in the reconstruction efforts of NGOs and aid agencies. But this sudden, sometimes overwhelming, barrage of support for the "disaster of the day" is not always best for the development of sound policies in disaster prevention and management.

The challenge is to translate some of that urgent and well intentioned interest into longer-term, and potentially more fruitful, efforts at mitigation and prevention. Instead of rescuing families from smoke and fire, the work involves sober analysis, methodical implementation and often intangible results—including techniques that traditionally have taken place outside the spotlight and have run into much greater difficulty attracting financing.

This is a fundamental shift in the way that the world views disasters, and it is well underway; examples abound of cities and countries that have benefited from new prevention programs. In 1970, for example, Bangladesh was devastated by a cyclone that killed 300,000 people. Since then, improvements in modeling technologies, more extensive local warning systems, detailed emergency strategies and the changes in construction procedures have massively reduced losses of life and the devastation of the country's recurring cyclone seasons. Around the world, construction codes increasingly take natural disaster experience into account, and local and national organizations have been training people how to augment the efforts of officials and emergency response teams when disaster strikes. The fruits of such prevention efforts are considerable: less frequent and less severe disasters, lives saved and property protected, new political attitudes and greater community involvement.

But prevention efforts need much more local and international study, greater use of new technologies and a broader effort at communicating the benefits. This approach is consistent with the goals of the International Decade for Natural

Disasters, which emphasizes preventative approaches to development. Until there is full international understanding of disaster preparation principles, people will still build their houses on vulnerable hillsides and be washed away by the first serious storm. National and international agencies need to calculate and comprehend the full costs of disasters beyond the immediate losses of life and property—in sidetracked development efforts, post-traumatic psychological damage, inappropriate and unnecessarily expensive planning, and even a numbness on the part of potential aid-givers as the damage occurs and reoccurs.

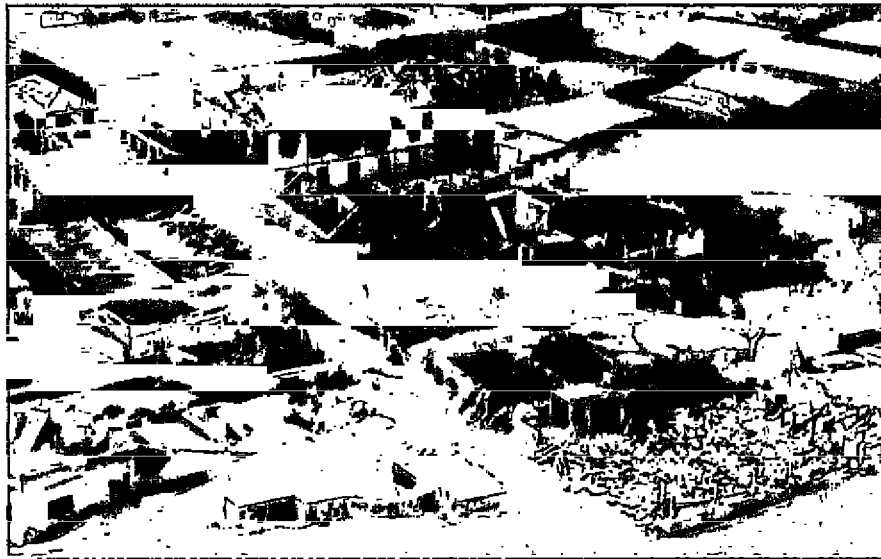


The risks can be shared and minimized. The insurance industry, already a major player in disaster mitigation in many parts of the developed world, rightly views efforts to improve preparation as a good business opportunity. The insurers' perspective is a valuable one, in that it involves payment of premiums and planning in advance to reduce losses and compensations following an event. Local training programs are another savvy and low-cost approach, since they can multiply the ability of disaster-response professionals to do their jobs when expertise and manpower are most urgently needed. Asking citizens to become involved in their own protection by educating them provides further incentives for dealing with problems before they occur. The appropriate use of new technologies can also play an enormous role by providing sophisticated and accurate mechanisms and instruments, such as climate modeling, seismic studies, spatially related information analysis, infrastructure development and building techniques.

In short, we can shift the worldwide emphasis from response to preparation. Human nature will not fundamentally change, and disasters will continue to provide the opportunity to rush to the aid of victims while vicariously experiencing the trauma through the eyes of television and newspaper reporters. The difference will be that we will know that we have done our best to avoid the tragedy in the first place.

ALCIRA KREIMER  
*Manager, Disaster Management Facility  
The World Bank*

# NATURAL DISASTERS



## WHAT IS THE TRUE COST?

The destruction of property and the short-term human costs of disasters are often enormously expensive. However, even these staggering costs may not account for the full impact. BY CHARLOTTE BENSON AND EDWARD J. CLAY

Estimates of annual losses from natural disasters over the first nine years of this decade averaged US\$75.9 billion (in real 1998 prices). There is also clear evidence that the costs are increasing. Real annual economic losses averaged \$4.9 billion in the 1960s, \$9.5 billion in the 1970s and \$15.1 billion in the 1980s. Record losses of \$191 billion were experienced in 1995, the year of the Kobe earthquake. The second highest ever losses occurred in 1998, with disasters around the world causing estimated economic damage of \$90 billion.

Dramatic as those figures are, the full economic cost is even higher. Estimated figures are largely based on direct physical impacts, or losses of fixed capital and inventory. Many indirect and secondary effects on economic activity—such as changes in fiscal policies or the long-term consequences of the reallocation of investment resources—go unrecorded. This partly reflects difficulties in isolating the impact of natural disasters from other factors on economic performance. Those assessing the costs of a disaster are usually concerned with meeting the short-term humanitarian needs of affected communities and funding reconstruction, and thus concentrate on physical damage.

A VOLCANO ERUPTION DEVASTATED MONTSERRAT'S CAPITAL, DESTROYING MUCH OF THE INFRASTRUCTURE THAT WAS REPAIRED OR REPLACED AFTER HURRICANE HUGO.

*Above*

THE MONTSERRAT CAPITAL OF PLYMOUTH IS GUTTED AFTER A VOLCANIC ERUPTION AUGUST 3, 1997.

This emphasis on direct, physical losses also engenders a widespread perception that, as a country develops and as the value of capital assets rises, the absolute cost of disasters increases and the relative cost as a percentage of gross domestic product (GDP) declines. However, recent analysis of the relationship between the structure and stage of development of an economy and its hazard vulnerability suggests a far more complex picture.

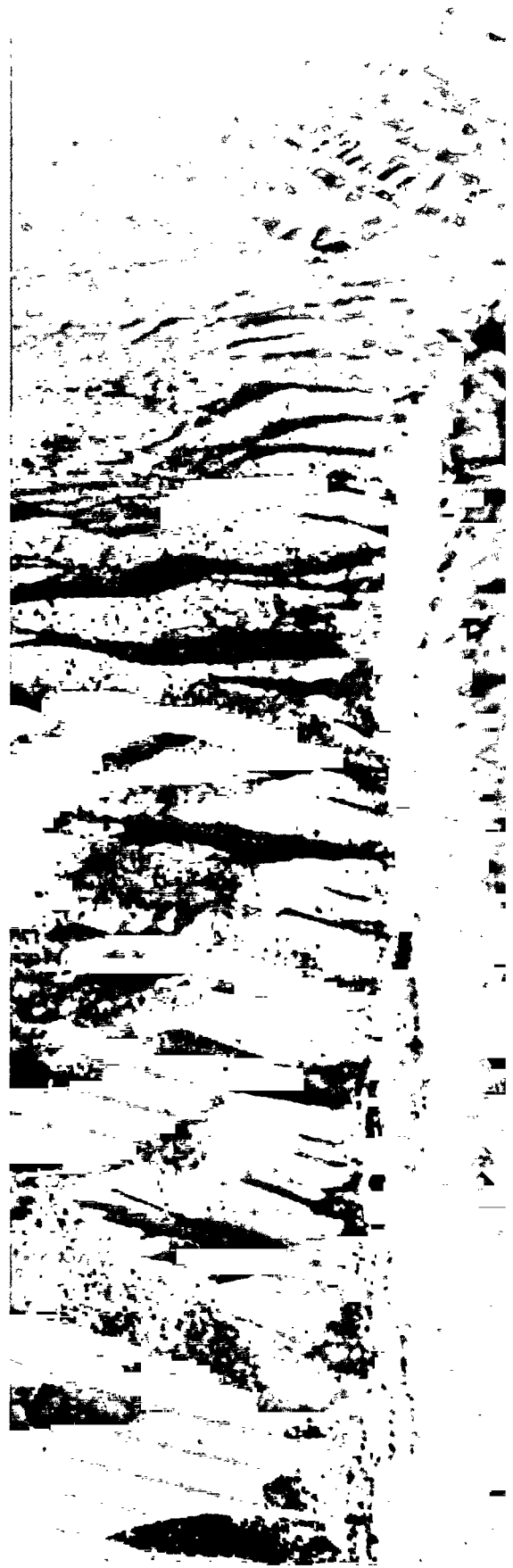
The economic impacts of a disaster depend on a range of factors, including:

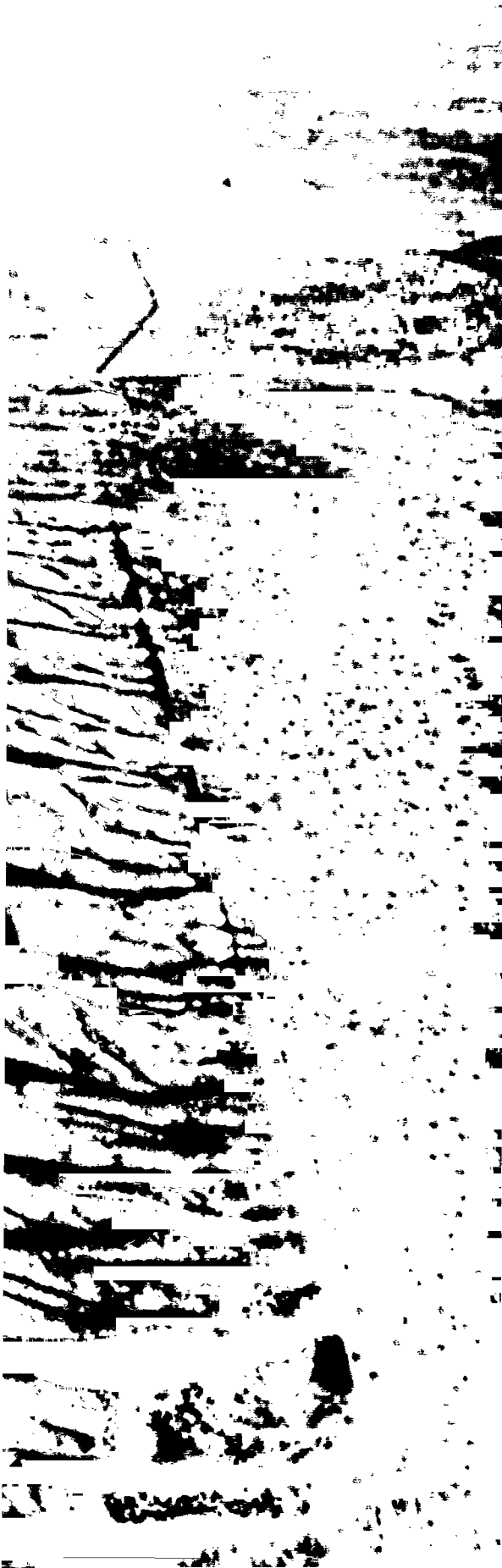
- The type of hazard
- Its geographical scale of impact
- The size and structure of an economy
- Prevailing economic conditions

Most obviously, different types of hazard cause varying levels of physical damage to infrastructure and agriculture, with implications for their indirect and secondary impacts. Droughts, for example, can result in heavy crop and livestock losses, while infrastructure and productive capacity are typically largely unaffected. Earthquakes usually have little impact on standing crops, but can cause widespread destruction of infrastructure and other productive capacity. Floods can cause extensive damage to both infrastructure and agriculture, depending on the agricultural cycle. When compared to earthquakes, however, a much larger share of flood damage may be readily repairable.

The relative frequency of various hazards in particular regions of the world also plays an important role. It can determine the scale and nature of disaster mitigation and preparedness measures. Scientific, objective information on the probability of occurrence of particular hazards over specified periods may be largely lacking. Or, where information does exist, it may not be widely disseminated. Perceptions of risk therefore play an important role in determining behavior. Those perceptions are strongly influenced by the intervals between events, and thus the experience with disasters shared by governments and civil bilateral and multilateral agencies. For example, the Caribbean island of Montserrat was severely damaged by Hurricane Hugo in 1989, with an estimated 98 percent of the island's housing stock, as well as the main jetty, damaged or destroyed. Total damage was estimated at \$240 million. Hurricane-proofing features were introduced into the design of houses and other buildings during reconstruction. However, little regard was paid to maps showing risk from volcano damage. There had not been a major eruption for over four centuries, so the risk was perceived as very low. The subsequent eruption, which began in 1995, has since devastated the island's capital, only four kilometers from the volcano, and destroyed much of the infrastructure that was repaired or replaced after Hugo.

The proportion of a country and region affected by a disaster also has implications. At one extreme—small island economies—natural disasters can have severe economic impacts. In the microstate of Niue in the South Pacific, the cost of repairing damage to government-owned buildings as a consequence of Cyclone Ofa, which struck the island in 1990, was estimated at \$4 million, equivalent to 40 percent of GDP. Except in the case of widespread drought, recent natural disasters have not had measurable impacts on national economic aggregates—such as levels of GDP, the balance of payments or the rate of investment—in larger countries. Instead, their effects are perhaps best conceived of in terms of development opportunities foregone at a national level, even though they can cause serious local economic disturbances. In the Philippines, for example, modest achievements in improving the country's transportation systems and the increased difficulties in meeting the social infrastructure needs of a growing population can be attributed to the fact that a large proportion of public resources that were earmarked for those programs has been redirected to disaster response. Relative hazard risks can also influence investment choices. In Vietnam, for example, some of the more hazard-prone regions have received disproportionately small shares of both private and public investment, as well as





external assistance.

As regards economic structure, factors such as the choice of crops grown and the composition of the manufacturing and service sectors play an important role in determining the extent of vulnerability. For example, many traditional root crops and coarse grains are more drought-tolerant than newer crop varieties. Hybrid coconut trees can be more vulnerable to typhoons than more traditional varieties, which typically have longer rooting systems. Indeed, the development process itself can exacerbate hazard vulnerability. In the case of drought, the effects are diffused more widely through a developed economy rather than being focused on the agricultural sector. This reflects greater overall integration and stronger intersectoral linkages between the agricultural and burgeoning manufacturing sectors, which in earlier stages of development are often orientated around agro-processing and the production of agricultural supplies. Increasingly sophisticated economy wide financial systems for flow of funds—including small-scale private savings and transfers—also play a role in diffusing the impact of drought more widely, including into urban areas. Public finance implications may also be more severe, since the government is likely to meet a larger share of the costs of the relief efforts itself rather than relying heavily on international assistance.

Finally, a myriad of factors, both coincidental and deliberate, act to offset or amplify economic impacts. In terms of the balance of payments, for example, a number of developing countries rely on a handful of commodities for a significant part of their export earnings. Fluctuations in the prices of such commodities, as well as in major imports such as oil, can exacerbate or minimize the impacts of natural disasters, usually by chance timing. In 1984, high coffee and tea prices helped Kenya sustain its export earnings at a time of severe drought. World market dominance can also play a role. The Philippines has effectively benefited as a major coconut product exporter, with temporary disaster-related declines in production offset by higher international prices.

On the positive side, high levels of vulnerability to hazards are not inevitable. There is considerable scope for reducing risk through the application of appropriately designed disaster mitigation, preparedness, relief and rehabilitation efforts. Such measures should not be viewed as discrete activities undertaken by specialist government agencies, but rather as measures that can be incorporated into development projects, as well as economic activities and government planning exercises more generally.

Current practices in many areas of economic activity could be adapted to reduce vulnerability. For example, extension workers could do much to promote techniques that reduce hazard-related agricultural losses, such as encouraging inter-cropping of taller and shorter field crops to provide some protection to the latter during typhoons. Similarly, building codes could promote hazard-proofing features in earthquake- and hurricane-prone areas. Broader government and donor policy and planning documents could also take greater account of natural disasters. Indeed, even governments with relatively limited financial resources can do much to reduce vulnerability, and the degree of commitment by the public sector and donors to such issues should not be measured in financial terms alone.

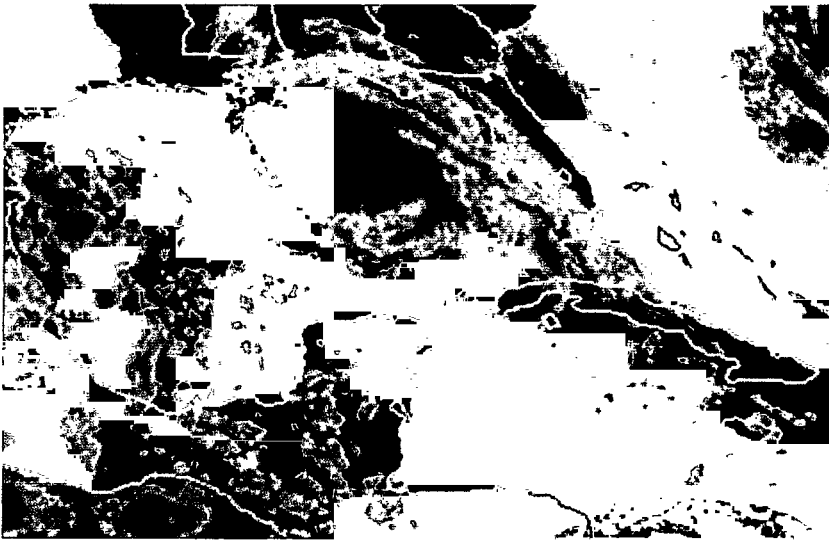
In addressing both hazard vulnerability and post-disaster response, more attention needs to be paid to economic activities, rather than focusing primarily on economic assets. This shift in focus would contribute to improved contingency planning and a more effective and considered response.

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*Charlotte Benson is an economist and member of the UK International Decade for Natural Disaster Reduction Risk Applications and Implementation Working Group. Edward Clay is a research fellow at the Overseas Development Institute, London.*

# FAMBLIN : ON GLOBAL CATASTROPHES

Despite significant technological and scientific advances, the ability to predict, quantify and prepare for natural catastrophes remains inadequate. While new approaches continue to be developed by a sophisticated insurance industry, they have not extended to a developing world largely unprepared for catastrophe and dependent on little more than divine providence. BY PAUL FREEMAN



*Above*

THE INSURANCE  
INDUSTRY RELIES ON  
COMPUTER MODELING  
TECHNIQUES TO  
UNDERSTAND AND  
MEASURE THE RISK  
AND IMPACT OF  
CATASTROPHES.

**A**cts of God—the three words that grace almost every insurance policy and that summarize the most unpredictable and devastating forces of nature: earthquake, flood, hurricane—are among the most difficult to insure against. Insurance works most effectively for events that occur frequently and have minor financial impact, such as traffic accidents or theft. These risks can be quantified and mapped over time—they are small, unrelated losses. Catastrophic events, on the other hand, have the opposite impact—they occur infrequently, with devastating effects often spread across large geographic regions.

Developing countries are often worst hit, socially and economically, by these catastrophes. A number of factors explain why developing countries suffer most. The key reason is that proper quantification tools and risk modeling techniques do not exist to explain why planning and management of risk transfer would benefit emerging economies vulnerable to natural hazard events. The second is a lack of insurance traditions in these countries. Finally, a juridical structure or central agency responsible for assessing, collecting and transferring risk is absent.

During the past decade, enormous progress has been made in understanding the nature and consequences of natural catastrophes. This is due to the increased use of catastrophe simulation modeling. Computer modeling techniques developed in the 1970s have been used to simulate both the physical characteristics and impact of natural hazard events and to estimate the economic loss over a period of time. However, the insurance industry did not take much heed of this modeling work until the 1990s, despite warnings that the industry had badly underestimated the costs of catastrophes. A series of major disasters, the most significant of which was Hurricane Andrew in 1992, changed the attitude of the insurance industry.

The development of computer modeling and the growing knowledge and understanding of the risk and impact of catastrophes have created a bigger market for the insurance industry. The amount of catastrophe insurance purchased in the world insurance markets has increased 34 percent over three years. In 1997, the most common type of catastrophe reinsurance—excess of loss coverage—amounted to US\$52.9 billion. The innovations in computer modeling have also created the opportunity for insurance companies and corporations to spread these risks to capital markets. Instead of having the risk assumed by the traditional insurance companies, the risk is “embodied” in new financial instruments called “catastrophe options” or “catastrophe bonds.” Through 1998, nearly \$2.7 billion of these capital market instruments have been issued for risks as varied as hurricanes and earthquakes in both the United States and Japan. While representing less than 2 percent of the total market for catastrophe risk transfer, the accessing of the capital market is an intriguing long-term option for catastrophe risk transfer. Unfortunately, the benefits of these risk transfer tools have been reaped almost entirely by the developed world. The United States, the United Kingdom and Japan accounted for 55 percent of

the total. For the United States, more than 50 percent of the total losses to private property from natural disasters is paid by insurance. By contrast, Asia, which accounted for half of all the damage caused by natural catastrophes and two-thirds of all the casualties from catastrophic events in 1997, owned only 8 percent of the insurance coverage for catastrophes purchased in the world market. This coverage absorbed less than 2 percent of total losses incurred. The remainder of these costs fell to either the government or victims, with some limited relief from international aid agencies.

The increase in natural disasters in developing countries and the lack of risk transfer options have had a dramatic impact on international lending institutions. Currently, most developing countries rely on "crisis" financing either from international lending agencies or by diverting funds from budgeted items—often from new infrastructure budgets—to pay for the cost of rebuilding damaged infrastructure. Since 1980, the World Bank has approved over \$14 billion in lending to assist countries where natural disasters have occurred. The Bank estimates that a proportion of credits approved for new infrastructure development have been diverted to pay for reconstruction following a catastrophic event.

In many developing countries, infrastructure is owned by the state, which must bear the costs of repair and reconstruction after a major catastrophe. The obligation of the government to pay for catastrophe losses would be less if a well-established insurance market existed that assumes partial responsibility for the damage to infrastructure. Governmental reform may be required to create a juridical entity to collect and transfer exposure to catastrophic risk as well as create the environment for an active private market.

In most of the developing world, the penetration of insurance is very low. For example, Latin America represents only 1.6 percent of worldwide insurance premiums. As a percentage of gross domestic product, insurance is less than 2 percent in Latin America as opposed to nearly 8 percent in North America. The lack of an insurance culture, as well as of the structural components associated with the pricing, collection and transfer of risk, often means that the "concept" of risk transfer is not considered as an option. The potential economic benefit of risk spreading is lost for these countries.

In developed countries, the transfer of risk retained by the government is often handled by a specialized governmental agency, such as the California Earthquake Authority. But in developing countries, most risk arising from natural catastrophes is borne by the central government, and no specific government agency exists

to pay for the cost of catastrophes. Historically, for risk to be transferred, it is essential that a juridical entity exist to collect and transfer risk. Without a specialized governmental unit taking responsibility for the problem, it is unlikely that an "indemnity" insurance structure is feasible.

The extent of modeling thus far conducted is such that parameters can be accurately set; it therefore may be possible to create a structure where a payment is made solely based on the occurrence of a specified event. For example, a catastrophe bond was created for earthquake risk in Tokyo that is paid on the basis of the size and location of an earthquake. The exact specification of the natural event is the parameter that triggers the obligation under the catastrophe bond. In some instances, this may be the only viable option if the ability to establish well-defined indemnity obligations is not possible.

Risk transfer can be a powerful planning tool. In relation to natural catastrophe risks, new tools have been developed over the last five years to help entities in developed countries transfer catastrophe risk to capital markets. Unfortunately, the benefits of these tools have not extended to developing countries. The World Bank is exploring ways to make the benefits of risk sharing available to a larger number of countries. As the frequency and severity of natural catastrophe events continue to increase, this work will become more important.

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*Paul Freeman is a senior research scholar for the Risk Modeling and Policy Project, International Institute for Applied Systems Analysis, Austria.*

**THE INCREASE IN  
NATURAL DISASTERS  
IN DEVELOPING COUNTRIES  
AND THE LACK OF  
RISK TRANSFER OPTIONS  
HAS HAD A DRAMATIC IMPACT  
ON INTERNATIONAL  
LENDING INSTITUTIONS.**

## **ENORMOUS AND ESCALATING COSTS**

**1998 proved to be another year of significant costs to the world from natural catastrophes claiming the lives of 50,000 people and causing economic damage of nearly US\$90 billion. This is the second highest damage total in history, only eclipsed by the damage caused in 1995 by the Kobe earthquake. Compared with 30 years ago, the annual cost of natural catastrophes has increased nine-fold.**

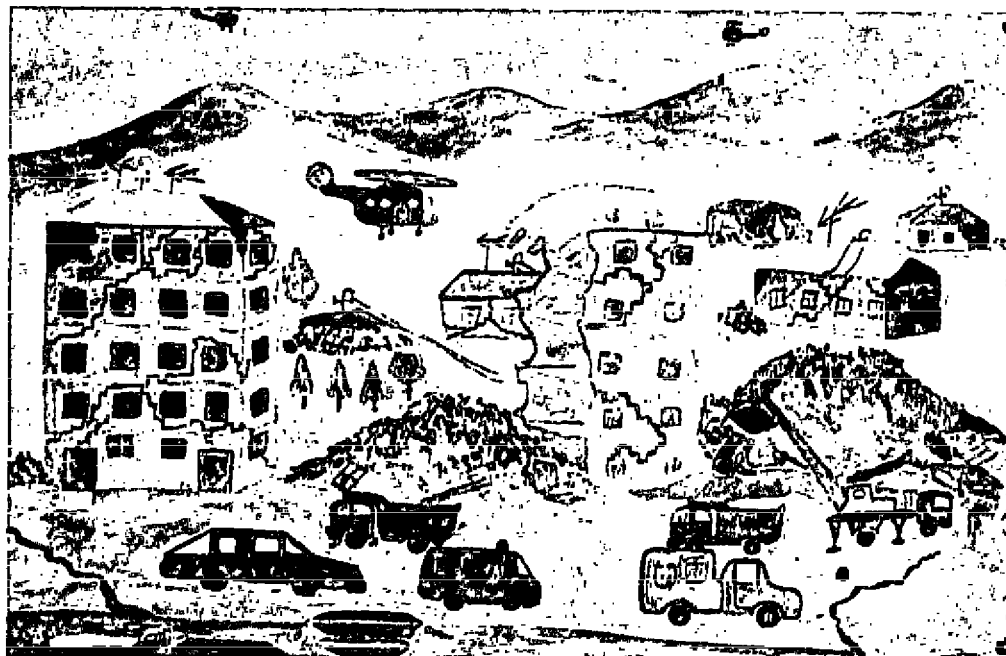
**Over the last 10 years, geological events such as earthquakes and volcanic eruptions have occurred evenly throughout the period, while the number of atmospheric events—windstorms, hurricanes, flooding, drought, avalanches and forest fires—have increased. Windstorms and flooding are most common, each accounting for approximately 33 percent of all events. Sixty percent of deaths from natural disasters are the result of floods. While economic losses from floods, windstorms and hurricanes are almost equally divided, with each accounting for nearly 30 percent of all losses, only 8 percent of flood damage is insured, as opposed to 67 percent of the damage from windstorms. The reason for this is that windstorms occur in areas of the world where there is a high level of insurance—the United States, Japan and Australia—while floods dominate in Asia, where the insurance level is low.**

THE

# INVISIBLE FACE

# OF DISASTER

The psychological impact of disaster remains long after the physical reconstruction of an area is completed. The challenge for disaster assistance professionals lies in understanding the true nature of disaster-related psychiatric disorders, finding both immediate and long-term programs to help those who are suffering. BY ITZHAK LEVAV



DISASTERS OFTEN  
AFFECT CHILDREN  
THE MOST.



Newspapers recount emotional stories about the devastating effects of disasters. Television does likewise, though more graphically, showing us horrible views of mutilated bodies, children clinging to their parents, adults searching for shelter, destroyed houses, debris-filled roadways and collapsed bridges.

What the mass media seldom report is the additional and long-lasting psychological toll disasters inevitably leave in their wake. This is a very real, very-costly impact, and there are abundant scientific data to support its existence. It has the potential to disrupt the lives of otherwise healthy survivors and to further endanger those who are wounded or sick. It pervades disaster sites long after the physical reconstruction has been completed, and it may even lie dormant for a time only to emerge later in wholly unexpected and devastating ways.

The challenge for disaster assistance professionals lies in understanding the true nature of

disaster-related psychiatric disorders and disability, separating them from the purely physical ramifications of assistance programs, and finding both immediate and long-term programs to help those who are suffering.

Let us reflect on the nature of traumatic events. Fundamentally, they embody intense fear, constitute a major threat to the integrity of life and body, and bring with them considerable losses, not only in terms of property but in people's personal sense of security and hopes for the future. This constellation of factors constitutes the framework within which disaster-linked reactions express themselves.

Although the nature of these reactions is mental and not physical, they can be measured and reliably diagnosed, just as physical damages are. Based on a study by the Pan American Health Organization/World Health Organization and the Ministry of Health in Tegucigalpa, Honduras following Hurricane Mitch, it is possible to estimate that between 400,000 and



600,000 adults throughout the country were emotionally affected by the disaster. Post-Traumatic Stress Syndrome and Major Depressive Disorder are two of the most commonly identified reactions that afflict disaster victims. The Honduras study showed precisely those reactions in the aftermath of Hurricane Mitch. Adults living in neighborhoods that were hit heavily by the storm had higher levels of psychiatric disorders. For instance, women from areas that were not severely damaged suffered major depressive disorders at a rate of 14.6 percent, whereas those who lived in areas exposed to the most destruction suffered at a rate of 26.2 percent. The proportions for men were 9.8 percent in low-risk areas and 15.8 percent in areas that suffered most. The figures for Post-Traumatic Stress Syndrome followed similar patterns.

The study also showed a rise in the abuse of alcohol among the men of Tegucigalpa. It is well known that individuals may attempt to reduce their mental anguish by turning to alcohol, since it is the most universal and readily available method of self-medication.

The researchers also found that the distribution of post-traumatic disorders was far from random. There was a direct connection between the rates at which the disorders appeared and the status of the neighborhoods, a proxy for social class. Rates were highest among the residents in shelters, all of whom came from neighborhoods with lower status, where the residents had endured the greatest stress.

Honduras is a country with markedly adverse economic, social and health situations. When the hurricane struck, more than half of its population lived at or below the poverty line; following the disaster, statistics showed that an additional 17 percent of the inhabitants had plummeted into poverty. Thus, the effects of the disaster were compounded by the situation on the ground.

When poverty levels are combined with what is known about the distribution of psychological trauma, there is a clearer pattern for aid workers to follow when dealing with psychological damage control. In other words, efforts to extricate people from poverty would need to take their probable mental status into account. That mental status could well constitute a factor that could weigh down those attempts.

Fortunately, much can be done to alleviate the trauma that people experience as a result of disasters. Obviously, nothing can replace programs that assist people in reconstructing their communities and their nation. Housing, food

and work are essential. But equally important is work on reorganizing communities, building support systems, fostering positive leadership and promoting a sense of solidarity. The appropriate psychological intervention and psychotropic medication for individuals, as well as counseling for groups, families and individuals, are all needed if mental health and quality of life are to be restored.

Mental health experts have many roles to play in disaster assistance, but one of the most important is to help fashion public policies. For instance, should children be separated from parents to provide them with safer conditions while the emergency lasts? Studies going back as far as World War II have shown that such a policy is wrong, despite the apparently humane motivation behind it. Should schools be closed? Mental health experts would recommend against it.

The experts can also assist decision-makers to cope with their own trauma. In one instance, a very perceptive mayor of a town in Nicaragua told me how affected she was by the whole thing yet, because of her duties, she felt that she could not leave her post. She longed to talk with someone who could understand her situation and offer help. Moreover, she wanted help for her excellent and committed technical team members, who had worked hard and efficiently during the emergency but who were now fighting with each other in the aftermath.

Helping people, whether they are in positions of authority or poverty-stricken victims, involves a wide range of outreach programs. Depending on their degree and complexity, they will undoubtedly increase the burden on service providers. What is clear is that there is no alternative but to make the effort. The psychological effects of trauma cannot be erased by simply turning away. National authorities and donors need to ensure that the psychological cries for help from those who are caught up in disasters are heard by informed ears.

When television cameras and newspaper reporters tell the story of destroyed buildings and gutted roads, there are very few arguments about the need to reconstruct the physical world and repair the structural damage. Less visible to the casual viewer—but arguably more important to the recovery of the afflicted nation—is the reconstruction of people. That is, after all, the overriding reason for any intervention.

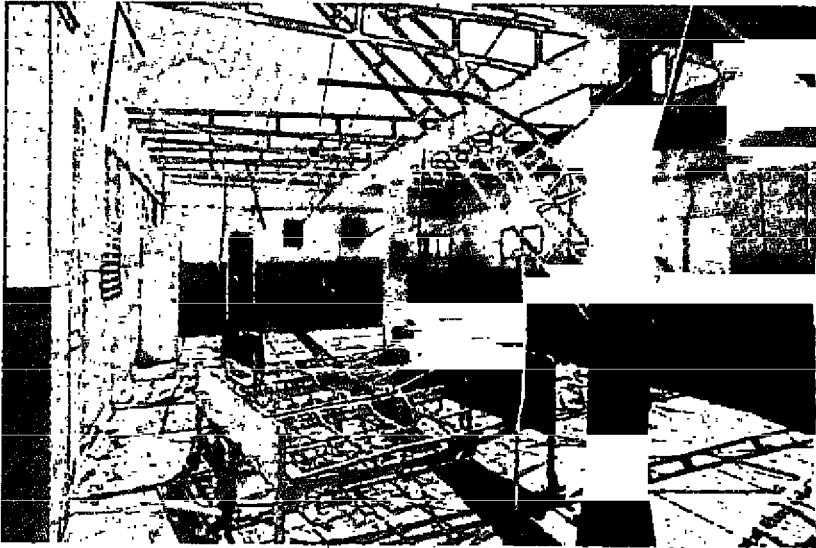
*Itzhak Levav is the mental health program coordinator in the Division of Health Promotion for the Pan American Health Organization.*

**MENTAL HEALTH EXPERTS HAVE MANY ROLES TO PLAY IN DISASTER ASSISTANCE, BUT ONE OF THE MOST IMPORTANT IS TO HELP FASHION PUBLIC POLICIES.**



# WHEN DOES HELP ACTUALLY HINDER?

External relief can often hamper national disaster prevention efforts. Effective government communication, and a commitment to invest in local prevention and preparedness, are ways forward. BY CLAUDE DE VILLE DE GOYET



*Above*

HURRICANE GEORGES  
LEFT ST. KITTS'  
JN FRANCE HOSPITAL  
AN UNUSABLE RUIN  
IN SEPTEMBER 1998.

Usually, the more dramatic the disaster, the more generous and spontaneous the outburst of assistance from the international community. Vivid images of suffering in the mass media move the public—and politicians—to action.

International relief has become both a necessity and a right—a necessity because no community or country can muster the human and technological resources needed to respond to the affected population in such a short time; a right because local authorities in developing countries are held to the highest standards of medical and social attention, standards that are often not realistic even in normal times. Failure to comply with these standards results in the “right of intervention” by outside humanitarian actors.

Does this external assistance act as a substitute for national efforts toward self-reliance? Are some forms of international relief counterproductive—even harmful—to local preparedness efforts? While there are no clear-cut answers, some aspects of international aid appear to have the potential to affect national preparedness adversely.

In the late 1980s and early 1990s, the lack of commitment and enthusiasm for preparedness and mitigation on the part of small Caribbean islands was largely attributed to the

over-reliance on generous external aid in disaster situations. What else can explain what happened on one of the islands, where the roof of a hospital was blown off and rebuilt with external funding on eight separate occasions over a 35-year period? The problem was not the willingness of donors to assist, but their failure to demand more stringent building codes.

In the past, disaster-prone countries felt that being “well prepared” would reduce their levels of external assistance. Fortunately, that is no longer the case. No country, even the smallest, reasonably expects the outside world to take care of all its immediate post-disaster needs. All realize that most of the effort will have to come from their own resources.

The willingness, even eagerness, of the medical community to assist disaster victims is widely praised and advertised. But the media and medical representatives fail to mention that significant time often passes between the sudden impact of natural disasters and the arrival of the teams. For years, the Pan American Health Organization (PAHO) stressed the unwelcome message that many communities fend for themselves for the first—and most critical—24 hours. Again and again, experience has shown that external teams cannot arrive in the “golden hours” when medical or surgical interventions are most needed. In the aftermath of Hurricanes Georges and Mitch, most of the foreign medical teams or field hospitals arrived too late, and consequently addressed more routine and pre-existing needs.

In some cases, they created another type of problem. External medical relief that substitutes for local assistance can discourage self-reliance and can also permanently weaken the local health services. When a sophisticated field hospital is set up without the stated objective of coordinating with and strengthening local health facilities, the early departure leaves a vacuum that local health workers cannot fill.

The Soufrière Hills Volcano on Montserrat in the West Indies destroyed the capital city of Plymouth in 1997, forcing the

partial evacuation of the island's population and the relocation of the remaining 3,500 people to the island's northern part. The Montserrat authorities and the government of the United Kingdom have since faced a daunting dilemma: the risk, however small, of a catastrophic eruption engulfing the entire island would be fully met only by permanently relocating the population. The massive financial cost of such an evacuation, and the desire of a community to remain on its homeland, thus compete with a zero-risk policy. Local authorities are now investing in preparations that would allow them to face moderate eruptions.

Mass evacuation before hurricanes—a measure adopted on an organized scale by Cuba—minimizes the loss of lives and injuries, but does not result in much public assistance. Drama—the usual trigger for generous public assistance—is minimized. In this case, a country is penalized for its level of awareness and preparedness. Such a contradiction needs to be addressed internationally.

Relief aid consists of spontaneous donations from individuals and ad hoc groups as well as the professional response by established governmental or nongovernmental organizations. Individuals, moved by media coverage, contribute both in-kind and in cash. Unsolicited in-kind donations—which most large humanitarian organizations quietly attempt to discourage—often represent over 50 percent of immediate health and welfare supplies, overwhelming the absorption capacity of the recipient country. This “secondary disaster” calls for specific preparedness measures. The Latin American and Caribbean countries, with PAHO support, have developed a sophisticated supply management system to handle this. The system enabled the countries affected by Hurricanes Georges and Mitch—as well as Colombia, which recently suffered an earthquake—to sort, inventory and classify large amounts of relief supplies and to account internationally for the donations. The success of the program stimulated the countries to train over 2,000 supply management volunteers.

Military assistance teams also have the potential to disrupt normal balances, since they usually coordinate directly with local forces, bypassing civilian channels. Many countries, especially in Latin America, are struggling to develop disaster management institutions that are based on the civilian sector. A joint civilian-military operations center

ensures coordination with the national emergency committee or civil defense system. Since the center may have access to overwhelming assets, in several instances it has shifted the actual command of operations away from civilian authorities, further debilitating weak national institutions. Perhaps short-term emergency operations are best conducted by military means, but in the long term they jeopardize efforts to strengthen civilian institutions. Dialogue between external military actors and national civilian authorities needs further attention.

It is now standard practice for bilateral donor governments to support local preparedness through grants or direct technical cooperation. Over the last 30 years, the U.S. Office of Foreign Disaster Assistance has led the way through its Prevention/Mitigation/Preparedness Program. In Latin America and the Caribbean, it is carrying out long-term training programs where national instructors are fully prepared and supported.

The UN Development Program recently received a mandate to assume leadership in prevention and preparedness. One of its first initiatives is the design, jointly with PAHO/WHO, UNICEF and OCHA, of a mechanism to provide technical assistance to national civil defense and promote the inclusion of risk management in the reconstruction process of countries affected by Hurricane Mitch.

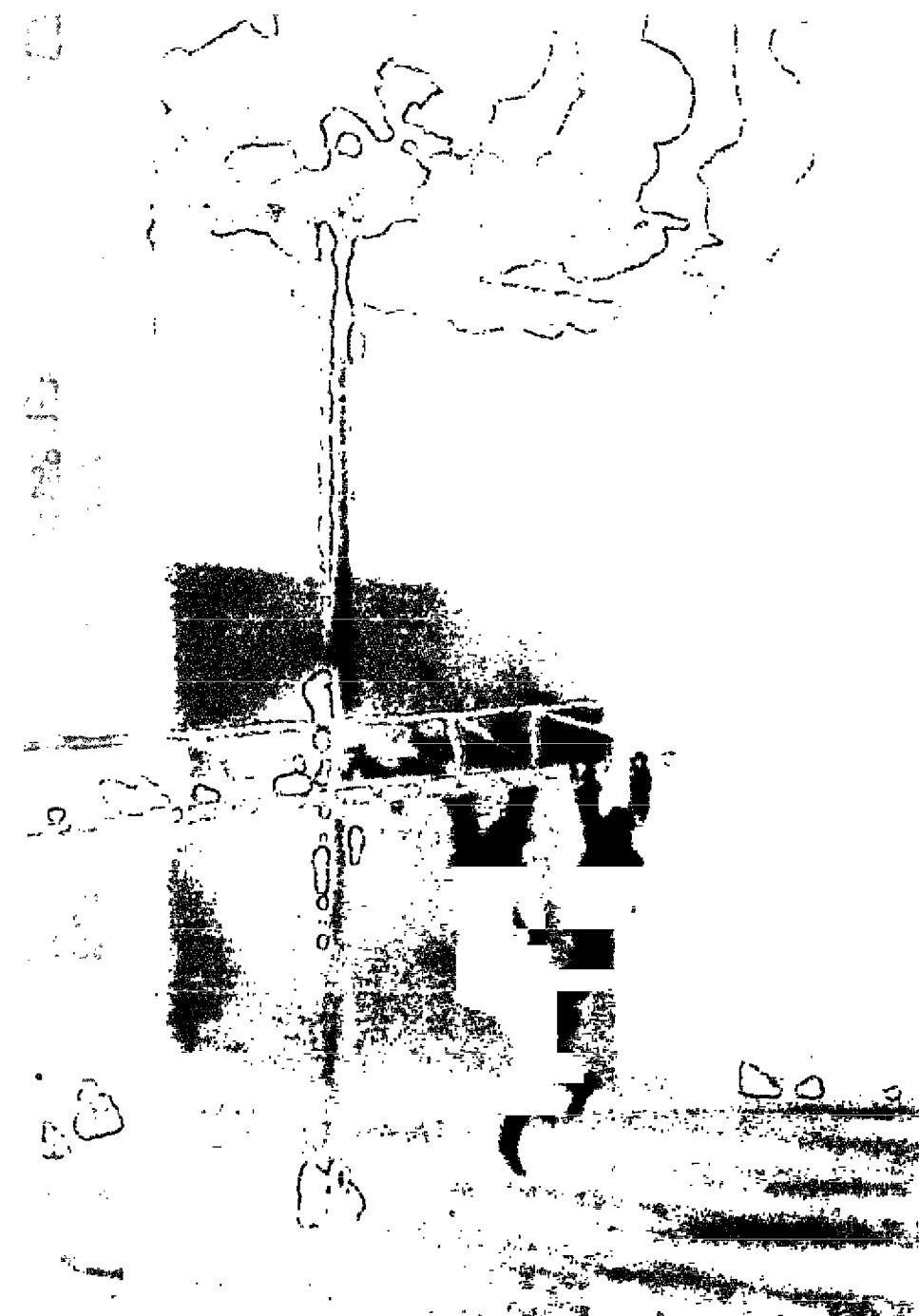
Although donor agencies are now becoming more sensitive to the need for local preparedness, gaps still remain. Funding for prevention and preparedness remains modest. Few donor agencies dedicate a fixed, significant amount to local institutional building prior to disasters. At the political level, investing in building capacity and improving training does not have the same appeal as organizing a military airlift. Funding for preparedness projects is often more difficult to obtain because their short-term cost effectiveness is difficult to measure.

Each country must address the needs of its local institutions, but preparedness is usually not a national priority except after a major disaster. Perhaps the best way for a response agency or external donor to avoid costly response errors is to divert a fixed portion of relief funds to local preparedness efforts.

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*Claude de Ville de Goyet is director of the Emergency Preparedness and Disaster Relief Program of the Pan American Health Organization.*

EXTERNAL MEDICAL RELIEF  
THAT SUBSTITUTES FOR  
LOCAL ASSISTANCE  
CAN DISCOURAGE  
SELF RELIANCE  
AND CAN ALSO  
PERMANENTLY WEAKEN  
THE LOCAL HEALTH SERVICES.



**M**ovie directors have always understood that the public loves to be scared without suffering. Disaster movies are thus among the most popular and financially successful types of films. In a list of disaster movies produced by Hollywood since 1928 there are eight volcanic eruptions, seven earthquakes, six hurricanes, four tornadoes, four floods, two tsunamis and an avalanche. The remainder are a rich mix of virus infections, cave or tunnel collapses, killer bee attacks, fires, terrorism, nuclear power station explosions, sinking ships, giant creature appearances and—in an example that must have brought particular pleasure to the special effects industry—global destruction. All too often, however, these movies depict events in a manner that is very much at odds with the reality of natural hazards.

Despite the best efforts of special effects departments, the hazards portrayed can look decidedly unconvincing or outright inaccurate. The cascading snow in *Avalanche* must have been especially low budget, with great chunks of white polystyrene flying about in all directions. Equally unreal is the lava flow down the streets of Los Angeles in *Volcano*, resembling red-hot treacle engulfing an architectural model of cardboard and balsa wood. Earthquakes in *San Francisco* and *The Rains Came* showed vast cracks opening in the ground, swallowing up all and sundry—something that is mercifully uncharacteristic of the actual seismic process. Another exceedingly misleading image occurs in *Dante's Peak*, where Pierce Brosnan lives up to his James Bond image by driving his pickup truck at breakneck speed toward a conveniently positioned tunnel in the mountainside, somehow outstripping an oncoming pyroclastic blast that, in the Mount St. Helen's eruption, traveled at 540 kilometers per hour.

But is the information provided about natural hazards deliberately misleading? Generally scriptwriters and directors seem to do their homework and have a broad understanding of the hazard characteristics they wish to portray, but their problem is one of overkill. All the freak physical and social events that can happen in multiple disasters are crammed together, often compressed into a single sequence. For example, in *Hurricane*, boats are wrecked, a convicted man tries to escape, trees are uprooted, buildings collapse and people tie themselves to trees. And that's just for starters: a coral reef breaks up, the island is totally submerged, a woman gives birth in the height of the storm, the church where people have gone for sanctuary is destroyed. It is just possible that such things may have been reported in hurricanes, but it would be exceedingly rare for them all to occur in the same event.

# DISASTERS IN HOLLYWOOD

Since the advent of movies, directors have been fascinated by disasters. But box office success and special effects do not make for accurate and informative portrayals of natural hazards. BY IAN DAVIS

Are the underlying causes of disaster vulnerability ever described? A key theme in *Avalanche* is that cutting down trees to make way for tourist development increases the risk of avalanches. A developer, played by Rock Hudson, strongly denies this in the pre-avalanche section of the film when ever he is challenged by an ecologically minded opponent. However, after the avalanche has descended to cause widespread havoc and loss of life to punish him for his sins, he belatedly admits full responsibility in the closing sequence of the film. "I caused all this; I am responsible," he laments.

Are conflicts between economic realities and public safety factors ever covered? An early scene in *Dante's Peak* contains a meeting of the town council, presided over by the mayor, played by Linda Hamilton. The meeting is called to consider the wisdom of a full-scale evacuation. One of the members ruefully considers the message such a step would have on the financier who has been courted by the town to invest in its future: "He is going to take his \$18 million and he is going to evacuate." Council members nod their heads in agreement. The conflict between safety and the local economy is also the dominant concern of the town council in *Flood*. Here the issue is whether to release water in the dam as water levels rise. The mayor is not the only member who believes that the future of the town is its good fishing and that the release of water will kill large numbers of fish and thus damage this vital tourist revenue. It is to the credit of the makers of these films that they highlighted these dilemmas, since all too often disasters are portrayed in documentary films or screened on the news as "Acts of God," without any recognition of underlying causal factors producing vulnerable conditions.

Is emergency management accurately portrayed? All of the members of the emergency management staff in *Volcano* stare at a giant TV screen and their computers instead of making any attempt to get on with managing the eruption on their doorstep. Meanwhile, their heroic disaster coordinator, played by Tommy Lee



### Filmed disasters

"VOLCANO," OPPOSITE,  
"HURRICANE," TOP, AND  
"SAN FRANCISCO," ABOVE.

Jones, is at the scene of the disaster as it unfolds. He organizes a dam of concrete road blocks to contain the lava flow, then mobilizes a demolition team to blow up a new building to form another unlikely dam. But the failures in emergency management in *Volcano* are dwarfed when compared to a truly unbelievable scene in *Flood*, when a city council member gathers a group of school kids, randomly found in the town street, and dispatches them to tell anyone they might come across to evacuate immediately. Not surprisingly, this ill-conceived warning strategy was not particularly effective.

Director John Ford focuses on community strategies in *Hurricane*. The community observes birds flying away from their island in anticipation of the impending storm—a well-documented community early warning system. A family ties itself to a tree in order to resist the wind force and remain above the level of a surge tide. During the 1977 cyclone in Andhra Pradesh, many inhabitants of coastal villages survived through this effective coping strategy. Families in the film also seek shelter in the church, the only solid building on the island. For minor storms, this may be an effective approach, but the strategy failed as the building collapsed on them. In many Caribbean hurricanes, apparently well-built solid churches have provided shelter for homeless victims, only to collapse and become their graves. Thus a perceived safety strategy turns out to be the exact opposite. In another film, recent arrivals neglect to close their shutters before a storm, a reminder that community coping response is often dependent on hazard frequency.

Hollywood can certainly be relied upon to trivialize and distort the reality of disasters or their management. But by scaring the public via the big screen these films also convey some sense of the terrible consequences that a real life disaster can bring.

*Ian Davis is professor of development and disaster management, Disaster Management Centre, Cranfield University, United Kingdom.*

## THE DISASTER IS COMING AND THE CAST IS READY

How typical is the average cast of a disaster movie? Disaster film directors have the advantage that their cast list is ready and waiting before the screenplay is even written. There is a veritable stack of predictable characters clamoring to get in front of the camera:

- The stranded dog on cat
- The developer who exploits the environment to create vulnerable conditions, all for quick money
- The corrupt official who suppresses an engineer's report that predicts technological failure
- The dying grandmother who, Eskimo-style, insists on being left to "meet her maker" rather than hold back the fleeing family
- Hyped-up experts behaving like over-excited school kids at their first summer camp
- The life-saving, good-looking hero
- The pregnant woman whose labor pains coincide with the disaster impact
- The lost or trapped child
- The brave expert (in the guise of a latter-day Noah) whose warning of impending disaster, initially rejected out of hand, is ultimately vindicated when "all hell breaks loose"

Is this cast list typical of real life? Yes and no. Such characters do occasionally figure in the vivid accounts I have heard from the survivors of the 30-odd disaster sites I have visited. But, more often than not, these highly colorful characters are not discernible at the actual disaster scene among the vast mass of ordinary, unheroic people who cope, or sometimes fail to do so, when extreme disasters affect them.

**TAKING**

# **ACTION BEFORE DISASTER STRIKES**

Project Impact, the U.S. Federal Emergency Management Agency's response to catastrophes, successfully merges local community preparation, understanding and responsibility for disaster prevention with the financial muscle and technical assistance of the national government. **BY JAMES LEE WITT**



*Above*

THE INCREASING  
NUMBER OF  
DISASTERS IN THE  
UNITED STATES HAS  
PROMPTED A NUMBER  
OF PREVENTION  
INITIATIVES BY THE  
GOVERNMENT.

In 1984, Tulsa, Oklahoma, situated between two rivers, flooded again. Fourteen people were killed. It was the ninth flood in 15 years, and the community was left grief-stricken and exhausted.

South and east of Tulsa, in Deerfield Beach, Florida, violent hurricanes repeatedly threatened the ocean-front community. In 1993, the community barely missed the wrath of Hurricane Andrew; city leaders saw the devastation in neighboring counties and knew something had to be done.

In 1989, the Loma Prieta earthquake shook Berkeley, California, and two years later a fierce wildfire killed 25 and destroyed 67 houses in that small community overlooking the San Francisco Bay.

All three of these communities are now part of a national initiative called Project Impact: Building Disaster Resistant Communities. This initiative of the U.S. Federal Emergency Management Agency (FEMA) is designed to reduce the impact and devastation of natural disasters by helping communities come together and take action before the winds blow, the rain falls and the earth moves.

"It makes sense to do something prior to a disaster. If you stay with it and educate your residents and your businesses, it will work" says Ron Ruback, the hazard mitigation coordinator for Deerfield Beach.

Project Impact was created in response to the terrible toll that disasters were taking in the United States. In 1998, there were 65 major disasters declared in the United States, involving 34 of 50 states plus Puerto Rico, the U.S. Virgin Islands and territories in the western Pacific. In all, FEMA obligations for 1998 totaled nearly US\$3 billion.

Unfortunately 1998 was part of a clear trend of an increasing number of disasters in this country. Relief costs following the Northridge, California, earthquake alone are more than

\$5.8 billion, and Hurricane Andrew relief stands at approximately \$2 billion. And FEMA relief figures do not include aid provided by other federal agencies or by volunteer agencies such as the Red Cross.

The picture is much the same around the globe. According to the United Nations, natural disasters kill 1 million people each decade and leave millions homeless each year. Economic damage from natural disasters has tripled in the past 30 years—rising from \$40 billion in the 1960s to \$120 billion in the 1980s.

In the 18 months since FEMA started Project Impact in seven pilot communities, the initiative has spread to 118 communities—at least one in every U.S. state. These communities face a variety of risks—tornadoes, hurricanes, floods, earthquakes, mudslides, volcanoes and others. But no matter what the risk, in each community the process is the same: city and county officials, business leaders, school administrators, fire officials, residents, environmentalists, church leaders and others work together to protect their neighborhoods and their futures.

Project Impact is not a grant program. It is a way of leveraging private sector commitments alongside new public sector approaches. This combination of federal dollars and technical support with private sector, nonprofit and state and local government partners is key. FEMA's initial investment of \$3.8 million in the seven original pilot communities, for example, has been matched by more than \$25 million in contributions from private, nonprofit and other government partners.

Project Impact operates on a common-sense damage-reduction approach, basing its work and planning on three simple principles: preventive actions must be decided at the local level, private sector participation is vital, and long-term efforts and investments in prevention measures are essential.

In Deerfield Beach, for example, federal

grants, combined with volunteer labor, retrofitted 44 homes, the public safety building, two fire stations and the high school, which serves as the community's primary shelter with hurricane shutters. "Hurricane shutters are very important and not very expensive," explains Ruback. "As long as a house is sealed, the wind can't get in."

In addition, the community is creating Neighborhood Emergency Teams (NETs) to ensure that neighborhoods are self-sufficient. These teams are trained in administering first aid, putting out small fires and conducting minor search and rescue operations. The intent is for neighborhoods to survive for 72 hours without outside help. Ruback says the community's education and awareness efforts are paying off, not just with the neighborhood teams but with small businesses and families willing to take precautions when a hurricane approaches. In the recent Hurricane Georges, fully one-third of businesses and half of residents shuttered their windows in anticipation.

"Education and awareness are the key to this program," says Ruback. "Deerfield Beach and FEMA can only give out so much money. When the money is gone, this program still has to go on. It will take the people to keep it going."

Resident support was vital in the success of Tulsa's efforts after a deadly 1984 flood left much of the city in tatters. The community began actions still underway today under Project Impact. Buildings were moved off the floodplain, and former neighborhoods and city streets closest to the river were converted into parks, trails and sports fields that could absorb flood waters.

"Project Impact has given the citizens of Tulsa a valuable tool to avoid future losses. Disaster-resistance measures reduce threats to life, property and the economy," explains Tulsa mayor Susan Savage.

In all, more than 1,000 houses were eventually moved from the floodplain, and more than \$200 million—including \$80 million in federal funds—were used. While not inexpensive, the mitigation efforts cost less than what just one flood would have cost the city—and spared the city future trauma and grief. For its efforts, Tulsa was named one of Project Impact's Most Outstanding Model Communities in 1998.

Berkeley was also recently honored by Project Impact for its achievements in programs that avoid damage due to earthquakes, wildfires and mudslides. The city established a partnership with a large corporate entity—the University of California at Berkeley. This partnership was established to address risks and serve as a model of how communities and educational institutions can work together to become disaster resistant.

Successful bond issuances allowed the city to upgrade schools, retrofit fire stations and install a backup water system to fight fires following an earthquake. The city organized a preparedness program that has trained 2,500 residents in first aid and early fire suppression. The city has also encouraged hazard mitigation measures by waiving permit fees for seismic upgrades of residences and setting up a tax rebate program. Berkeley also is working with property owners in vulnerable wildfire areas to manage vegetation, reduce fuel load and encourage drought-resistant planting.

"It's very wise to invest in hazard mitigation. It's a very cost-effective way to protect communities and regions from the devastation of natural hazards," says Arrietta Chakos, chief of staff to Berkeley's city manager.

While these cities are distant from each other and face significantly different natural disasters, they all must first determine their local risks, identify partnerships to help implement necessary actions and then prioritize and implement the actions. Granted, some of the actions can be costly. Retrofitting buildings to make them earthquake safe or relocating businesses out of a floodplain may take resources, planning and time. But many less costly and difficult actions can be taken. Relatively small modifications to homes and businesses can make them more likely to withstand hurricanes or earthquakes. One study has shown that FEMA has saved \$2 in disaster costs for every \$1 spent by buying flood-vulnerable properties.

Businesses also play a large role in the success of creating disaster-resistant communities. More than 680 businesses have signed on as Project Impact partners, lending expertise, staff, creativity and funding. Visa Corporation, for example, has pledged donations to Project Impact for every flood insurance policy charged to its credit card, while low-cost loans for household mitigation have been made available by Fannie Mae, the nation's largest source of funds for home loans. Some home improvement store chains are offering classes on disaster mitigation to their customers.

So communities in the United States are taking responsibility, getting involved and taking action before disaster strikes. No matter where the community is or what risks it faces, the results can be the same—a safer future for families, communities and businesses.

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*James Lee Witt is the director of the U.S. Federal Emergency Management Agency.*

For more information, visit the FEMA Web site at: <http://www.fema.gov>



**PROJECT IMPACT**  
IS DESIGNED TO  
**REDUCE THE IMPACT**  
OF NATURAL DISASTERS BY  
HELPING COMMUNITIES  
TAKE ACTION BEFORE  
THE WINDS BLOW,  
THE RAINS FALL AND  
THE EARTH MOVES.

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- to promote the inclusion of risk analysis in World Bank operations, analysis and country assistance strategies;
- to promote training in the areas of disaster prevention, mitigation and response; and
- to identify policy, institutional and physical interventions aimed at reducing catastrophic losses from natural disasters through structural and non-structural measures, community involvement and partnerships with the private sector.

For further information, contact:



Disaster Management Facility  
World Bank, Room F4K-282  
1818 H Street, NW  
Washington, DC 20433

E-mail: [DMF@worldbank.org](mailto:DMF@worldbank.org)

Web site: [http://www.worldbank.org/html/fpd/urban/dis\\_man/dis\\_man.htm](http://www.worldbank.org/html/fpd/urban/dis_man/dis_man.htm)