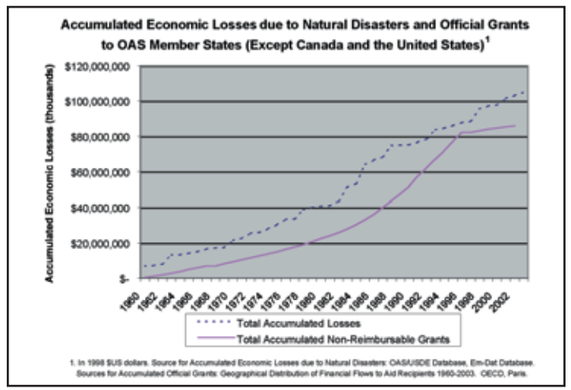
LESSONS LEARNED

Since 1983, the Organization of American States has supported work of member states in identifying, designing, and implementing policies and programs that reduce vulnerability. Lessons learned include:

- Disasters resulting from natural hazard events are often described as development failing to take into account vulnerability to natural hazards. This points to the need for more systematic attention to natural hazard risk identification and risk and vulnerability assessments.
- Natural hazard risk management efforts tend to be particularly effective when explicitly addressed at national, sub-national, community, project, sector, and sector policy levels.
- Recovery is seen as or assumed to be the "window of opportunity" to introduce disaster mitigation measures. Yet, as learned with reconstruction after Hurricane Mitch in Central America, countries must include risk management in project loan cost and not as a stand-alone component dependent on grants.
- Public and private sector owners and operators of infrastructure should be held accountable for the levels of risk (of failure under natural hazard conditions) in the projects they design, build, and maintain.
- Economic cost-benefit evaluations may not always justify risk reduction directed at the poor, other vulnerable groups, and the social sectors (water, health, education), but addressing the needs of these groups is in the broader national interest and is an essential part of any sustainable development strategy.

For further information, please contact Stephen Bender (sbender@oas.org) in the Unit for Sustainable Development and Environment of the General Secretariat of the Organization of the American States (OAS/USDE). *This USDE Policy Brief Series provides a forum for discussion on issues pertaining to sustainable development to help transfer good practices and lessons learned from project design and implementation. This is the fourth in a series that includes topics on:*

— Biodiversity Conservation
— Water Resources Management
— Transboundary Aquifers
— Environmental Assessments of Trade
— Renewable Energy



For Latin America and Caribbean countries taken as a whole, the accumulated economic losses due to natural disasters exceed the accumulated non-reimbursable development assistance. This is especially important if one considers that countries borrow money to develop infrastructure, and destruction of such assets accounts for most of the declared economic losses. Non-reimbursable grants are often made available to cover the cost of infrastructure replacement, but they never cover all social, economic, and secondary costs. Meanwhile the countries continue repaying the loans originally used to develop the infrastructure.

BOX 3.
NATURAL HAZARD RISK INDEXING INITIATIVES PERTINENT TO OAS MEMBER STATES

International financial institutions, international humanitarian assistance organizations, bilateral development lenders and donors, and the private sector are actively developing and using vulnerability and risk indexing schemes to evaluate investment, development assistance, and potential humanitarian aid needs in OAS member states.

Disaster Risk Index (DRI)
United Nations Development Program
http://www.undp.org/bcpr/disred/red/rdr.htm
Relies on disaster fatalities as a measure of vulnerability to project future loss.

Environmental Sustainability Index (ESI)
World Economic Forum
http://www.ciesin.columbia.edu/indicators/ESI
Provides annual cross-national comparisons and rankings of environmental performance according to 20 environmental sustainability indicators in five categories.

Global Unique Identifier Number (GLIDE)
Asian Disaster Reduction Center
http://www.glidenumber.net
Standardized referencing system (coding) for disasters to aid searching process through national and global databases.

Global Disaster Risk Hotspots (Hotspots)
World Bank, ProVention
Based on "hotspots" or areas with combined high natural hazard risk, exposure, and high vulnerability, it calculates risk with respect to both human and economic loss regardless of state boundaries.

Indicators for Disaster Risk Management (IDRM)
Inter-American Development Bank
Made specifically for LAC, it considers macroeconomic and financial risk, social and environmental risk from small and frequent natural hazard events, risk management capacity, and socioeconomic fragility/resilience.

Vulnerability and Capacity Assessment (VCA)
International Federation of Red Cross and Red Crescent
http://www.ifrc.org/what/disasters/dp/planning/vca
National and sub-national level vulnerability and capacity assessment toolkit not only for major disaster risk but "every day" factors that create vulnerability.

Unit for Sustainable Development & Environment

www.oas.org/usde

Managing Natural Hazard Risk: Issues and Challenges[1]

NATURAL HAZARDS IN THE AMERICAS

Natural hazard events such as earthquakes, volcanic eruptions, hurricanes, landslides, floods, droughts, and wildfires are commonly known as natural disasters. Natural disasters refer specifically to those events in which impacts exceed local or national capacity to address them, thus requiring outside emergency assistance. The Americas are highly prone to natural hazards due to geography. The Sierra Madre neovolcanic axis, the Central American isthmus and Andean ridge are all subject to earthquakes and volcanic eruptions. The American tropics, located in the hurricane belt, experience seasonal storms and hurricanes brewed in the Atlantic, Pacific, and Gulf of Mexico. The Southern Cone is subject to extensive flooding, while nearly the entire Latin America and Caribbean Region (LAC) is affected by the recurring El Niño climate phenomenon, which can cause both flooding and drought. The frequency of natural hazard events, combined with widespread vulnerability spawned by under-development, is what makes the Americas second only to Asia in the average annual number of reported natural disasters. Between 1990 and 2000 in LAC, major natural disasters affected more than 40 million people, caused over $20 billion dollars in direct damages, and resulted in the deaths of more than 45 thousand people.[2]

Addressing the impact of floods on agriculture.

Since the 1960s, natural disasters worldwide have more than tripled and economic losses have increased more than eight-fold.[3] At the same time, the death toll has been cut in half owing to decades of international technical assistance giving priority attention to disaster rescue, relief, and more recently, preparedness. Factors that explain the dramatic increase in disaster events and economic losses include: rapid and poorly controlled urbanization (in LAC, the population is 76 percent urban[4]); widespread rural and urban poverty; ineffective public policy; increasing construction of municipal and production infrastructure in hazard-prone areas; a more active period of El Niño Southern Oscillation episodes; climate variations; and environmental degradation leading to loss of ecological services, such as those provided by forests, which buffer against natural hazard events.

Until the 1970s, the international community considered disasters to be exceptional circumstances, and the term disaster management typically referred to disaster response in that disasters were managed after they occurred. Disasters were almost the exclusive domain of civil defense institutions, the Red Cross and Red Crescent Societies, and private voluntary organizations. However, in the 1970s and 1980s, the need for preparedness and the relationship between development and disasters became more clearly defined. By the time the Declaration of Yokohama at the United Nations World Conference on Disaster Reduction was launched in 1994, it was widely recognized in the Americas that disaster impacts were due, in large part, to failed development approaches. The United Nations raised the profile of natural disasters by declaring the 1990s to be the International Decade of Natural Disaster Reduction. However, then as now, national policies for natural hazard risk mitigation were, for the most part, not in place and vulnerability reduction was limited. A number of catastrophic events in the region *(see Box 1)* – some affecting the same nations in quick succession – served as stark reminders of the urgency of addressing disaster risk. These events permanently changed the perception that emergency preparedness and post-disaster response (which address only effects, not causes) constituted an adequate approach.

Today risk management consists of both a post-disaster phase (emergency response, rehabilitation and reconstruction) and a proactive pre-event phase comprising: risk identification, risk reduction, risk transfer, and preparedness. Each step involves tools, including hazard, vulnerability, and risk assessments, which aid decision-makers in selecting suitable measures and solutions. Such measures include insurance and pooled risk arrangements, strengthening of early warning systems, and incorporating natural hazard risk management into: zoning and land-use planning; national and sector policies; and engineering standards and codes relating to prevalent natural hazards.

LAC countries continue to make the transition from three decades of emergency preparedness and disaster response to a more comprehensive approach that includes actively reducing natural hazard vulnerability in existing and new development. Some countries are modernizing national disaster institutions. Others are revising legal frameworks and organizing or joining regional institutions for coordination and prevention of disasters. Still others are beginning to address long-standing structural hurdles to improving risk management, including: the meager use of appropriate risk information by decision-makers; the private sector's minimal involvement in prevention and risk management; political paralysis to integrate prevention and mitigation; and the weak overall technical and operational capacity of disaster risk management institutions.[5] Efforts such as these are critical for protecting vulnerable populations, safeguarding infrastructure, bolstering national security, and shielding valuable economic assets from devastation. *(See Box 1 for examples.)*

1. By Paula J. Posas (usdecpr3@oas.org), Environmental Specialist, and Stephen O. Bender (sbender@oas.org), Division Chief, Natural Hazards, at the OAS Unit for Sustainable Development and Environment with inputs from interns Valery Bode and Juan Domenech-Clar. The photograph above, taken by Pedro Bastidas in 1999, shows members of a local community in El Salvador installing instruments for a flood early warning system as part of the OAS-led "Flood Vulnerability Reduction and Local Alert System in Small River Valleys Program in Central America."
2. Clarke, Caroline et al. 2000. Facing the Challenge of Natural Disasters in Latin America and the Caribbean: An IDB Action Plan. Washington, D.C.: Inter-American Development Bank.
3. Munich Re. 2000. Topics: Natural Disasters. Munich: Munich Reinsurance Company.
4. World Bank. 2003. Honduras At A Glance.
5. Clarke, Caroline et al. 2000. Facing the Challenge of Natural Disasters in Latin America and the Caribbean: An IDB Action Plan. Washington, D.C.: Inter-American Development Bank.

BOX 1.
SELECT STATISTICS ON NATURAL DISASTER COSTS

(1) Hurricane Mitch inflicted losses totaling more than 10 percent of Central American GDP for 1998 and demonstrated the pronounced vulnerability of a number of sectors. 85.6 percent of total losses were in the productive sector (64.9 percent) and in infrastructure destruction (20.7 percent). Agriculture, cattle, fishing and forestry sectors accounted for 49.0 percent of total losses, while destruction of highways, bridges, and train tracks, which rose to over a billion dollars, accounted for 17.8 percent of total losses. Mitch affected not only the most important economic sectors, but also urban and rural populations of all income levels.[6]

(2) The El Salvador earthquakes in 2001 (beginning with one at 7.6 on the Richter scale) damaged 30 thousand farms and 20 percent of the coffee processing plants, severely affecting the means of income for rural families still recovering from Hurricane Mitch. Forty percent of the nation's schools were damaged and one fourth of the health infrastructure network destroyed. The earthquakes interrupted transport on the Pan-American Highway and 500 rural roads, and aggravated already severe environmental degradation.[7] Among other things, these impacts resulted in a redrawing of the national poverty map.[8]

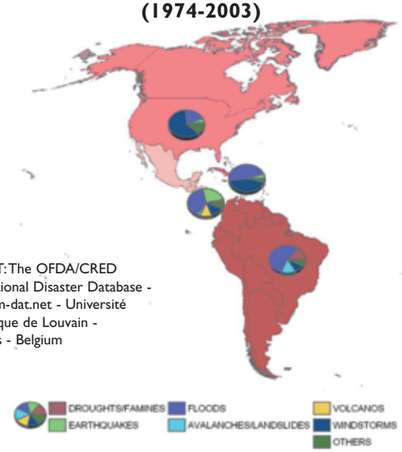
(3) In Argentina, Ecuador, Honduras and Nicaragua costs associated with floods amount to more than one percent of GDP annually.[9]

(4) Brazil, Chile, Venezuela, Ecuador, Colombia, Cuba, Nicaragua, El Salvador, Honduras, Guatemala and Mexico are among 28 countries worldwide that have suffered direct disaster losses of over $1 billion each in the past 20 years.[10]

CHALLENGES

Risk and Vulnerability. Managing natural hazard risk is a long-term development issue, not solely a set of actions taken before, during, and after a disaster event. Nations, sectors, and communities can mitigate natural hazard risk in anticipation of such events through appropriate management of the conditions of vulnerability (physical, social, economic, and environmental factors or processes that increase the susceptibility of a community to the impact of disasters). Per capita losses associated with natural disasters are 20 times higher in the developing world than the developed world,[11] mostly because conditions of under-development and poverty make people and infrastructure particularly vulnerable. For example, infrastructure location, construction methods, and how natural resources are managed all influence vulnerability. Poorly planned development can magnify the impacts of recurring phenomena on populations, economic assets, and ecosystems. Dense populations in a floodplain are likely to suffer even during a regular rainy season, especially in settlements below potential landslide areas. However, more robust land-use planning could have prevented settlements in dangerous areas or required infrastructure to meet certain design and construction criteria.

DISASTER TYPE PROPORTIONS FOR THE AMERICAS BY UNITED NATIONS SUB-REGION (1974-2003)



EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium

Poverty. The impoverished and people living on the economic margin are especially vulnerable in the face of natural disasters.[12] Disasters harm the poor in the short run and undercut their ability to move out of poverty by depleting or destroying their properties and livelihoods. Poverty can also compel people to migrate to larger cities in search of employment opportunities. Without the economic means to participate and integrate into town and city societies, the poor create shantytowns often on the outskirts of cities in areas with high hazard exposure risks. For instance, in the case of the major rain-induced landslide in Venezuela in 1999, which affected between 80-100 thousand people, most of the 30 thousand disaster deaths can be traced back to an informal settlement that was washed away during the event. In Venezuela, about 30 percent of the total population and 50 percent of the urban population live in informal settlements.[13] Vulnerabilities of this scale demonstrate how poverty increases vulnerability to natural disasters and why disasters contribute to perpetuating poverty. Without addressing this unfortunate dynamic and vicious cycle, overcoming poverty and related Millennial Development Goals will not be possible.

Impeded Development. When a major natural disaster occurs, a substantial percentage of development lending to a given nation has to be reprogrammed to repair or replace damaged infrastructure, thus diverting government resources away from longer-term development objectives. In addition to hidden, indirect, and secondary costs, lending for disaster recovery represents a two-fold loss – both a loss of previous investment, and a loss of future capital due to development activities that have had to be postponed, sidelined, or dropped to address emergency needs. In some countries, the development agenda is being set for years to come by the disaster recovery needs.

OVERCOMING OBSTACLES

Environmental Management. Land degradation, unsustainable agricultural practices, and weak coastal zone management contribute substantially to disaster risk, while environmental management of natural resources is a powerful mechanism to reduce vulnerability to disasters. *(See Organization of American States (OAS) Primer on Natural Hazard Management online and United Nations International Strategy for Disaster Reduction "Living with Risk" publication for more information at http://www.oas.org/nhp.)* Wetlands provide environmental services including flood mitigation, shoreline stabilization, erosion control, and a measure of protection from storms and tidal surges. Forest cover greatly reduces the probability of landslides, soil erosion, floods, and avalanches. Barrier reefs, barrier islands, and mangroves mitigate hurricane damage and storm and tidal surges. Policies and practices to promote environmental management of watersheds, ecosystems, and urban areas have been proven to reduce and buffer against the effects of natural disasters.

Sector Mainstreaming. Transportation, tourism, agriculture, water, energy, health, education and other sectors comprise core areas in which disaster risk management needs to be internalized and mainstreamed. National development plans should include natural hazard risk management targets and measures to ensure regulatory oversight of sectors (especially in light of recent privatization trends). Dealing with disaster management as its own topic, divorced from the sectors that make development possible, does not lead to significant reductions in disaster risk. As is bring done in some OAS member states, the sectors need to assess and address their own vulnerability and be regulated by national policies that reinforce treatment of natural hazard risk management as an investment rather than a cost.

Funding, Accountability, and Incentives. Funding and assigning a responsible party (for project design, implementation, monitoring, evaluation, etc.) are nearly always essential to successful development activities. Natural hazard risk management is not an exception to this rule. The three main entities involved in disaster management, defined broadly – the emergency management community, the mitigation community, and the traditional development community – vie for financial support yet there are few examples of a systematic, sustainable process for managing natural hazard risk as a part of the development process. The lack of financing for pre-disaster measures, misaligned funding (that is not given or lent to those who have the jurisdiction to make meaningful changes or who have a stake in reducing infrastructure vulnerability), and scarce incentives and penalties (accompanying regulations and directed at responsible parties) for mitigation and risk management have further contributed to the disproportionate emphasis on post-disaster response in LAC. This situation can be addressed by national governments, lenders, and donors who:

- understand the dynamics of the communities vying for control of disaster-related funds;
- encourage pre-disaster vulnerability reduction and mitigation measures;
- promote and insist on sound land-use planning, environmental management, and construction standards in new development;
- help design and promote incentives (such as technical support, benchmarks, certification, publicity, and awards) for better practices and attention to natural hazard risks.

BOX 2.
RECENT EFFORTS OF THE OAS IN NATURAL HAZARD RISK MANAGEMENT

- Collaborating with Caribbean countries on natural hazard risk reduction and adaptation to climate change initiatives; assisting with hazard mapping, vulnerability assessments, and mitigation planning; establishing safer building practices; working with the insurance industry on risk reduction incentives; and implementing natural hazard-related components of development projects and supporting capacity building programs.
- Supporting the Caribbean Development Bank and the World Bank in developing policies and processes for mainstreaming natural hazard risk management in lending and other institutional activities. See <http://www.oas.org/cdmp/hazsites.htm>.
- Through the Inter-American Committee on Natural Disaster Reduction (IACNDR) and OAS Permanent Council's Committee on Hemispheric Security, monitoring and assisting OAS member states in understanding the structure, function, and significance of vulnerability and risk indexing initiatives *(see Box 3)*.
- Working with inter-American sector organizations (telecommunications, education, transportation) to reduce vulnerability of sector infrastructure to natural hazards. See <http://www.oas.org/nhp> for details and a more complete list of projects.
- Supporting the implementation of the Inter-American Strategic Plan for Policy on Vulnerability Reduction, Risk Management, and Disaster Response (IASP), which aims to assist OAS member states to reduce loss of human life and property, improve emergency preparedness and response, improve financial protection from hazards, and make economic and social infrastructure more resilient to the impacts of natural hazard events.

ROLE OF INTERNATIONAL INSTITUTIONS

Multilateral lending institutions such as the Caribbean Development Bank, Inter-American Development Bank, and the World Bank continue to review and update policies and approaches to post-disaster assistance; together with the insurance sector, they are also examining new approaches to financial risk management for borrowing countries. The Andean Development Corporation, United Nations agencies, and bilateral development assistance agencies continue to work with specialized emergency management organizations and local entities to address disaster management issues. The International Federation of the Red Cross and Red Crescent Societies and Pan-American Health Organization are increasing their efforts to focus on vulnerability reduction at the local level, while the Organization of American States continues efforts to assist LAC countries and sector organizations with vulnerability and risk reduction *(see Box 2)*. Regional organizations in the Caribbean, Central America, and the Andean Region[14] are taking on roles of promoting and coordinating efforts in defined phases of disaster management.

International institutions need to systematically expand their focus on how their projects reduce or increase natural hazard risk. They also must continue to disseminate lessons learned, best practices, and empirical information in order to assist borrowing countries with policy options, technologies, capacity building, and technical inputs.[15] A particular area of opportunity involves vulnerability assessments and their inclusion in the policies and project activities of international development lending institutions, bilateral aid agencies, and non-governmental organizations working on community development.

6. Economic Commission for Latin America and the Caribbean (ECLAC). 1999. Centroamérica: Evaluación de los Daños Ocasionados por el Huracán Mitch, 1998. <http://www.crid.or.cr/digitalizacion/pdf/spa/doc12958/doc12958.pdf>.
7. United Nations Environment Program. 2002. Global Environmental Outlook 3, Chapter 2.
8. World Bank. 2001. Country Assistance Strategy for El Salvador. Washington, D.C.
9. Swiss Re. 1998. Natural catastrophes and major losses in 1997: Exceptionally few high losses. Zurich: Swiss Reinsurance Company.
10. Munich Re. 1998. World Map of Natural Hazards. Munich: Munich Reinsurance Company.
11. Gilbert, R. and A. Kreimer. 1999. Learning from the World Bank's Experience in Disaster Related Assistance. Washington, D.C.: World Bank Urban Development Division, p. 54.
12. World Bank. 2001. World Development Report 2000/2001, Chapter 9. Oxford: Oxford University Press.
13. International Federation of the Red Cross and Red Crescent Societies (IFRC). 2001. World Disasters Report, Chapter 4. <http://www.ifrc.org/publicat/wdr2001/chapter4.asp>.
14. Caribbean Disaster Emergency Response Agency (CDERA), Coordination Center for Natural Disaster Prevention in Central America (CEPREDENAC), and the Andean Committee for Disaster Prevention and Assistance (CAPRADE).
15. See <http://www.disaster-info.net/socios_eng.htm> for some regional examples.